

# Middlesex County Retirement System

Actuarial Valuation and Review as of  
January 1, 2014





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*February 26, 2015*

*Middlesex County Retirement Board  
Middlesex County Retirement System  
25 Linnell Circle  
Billerica, MA 01865*

*Dear Board Members:*

*We are pleased to submit this revised Actuarial Valuation and Review as of January 1, 2014. This report replaces the report dated December 12, 2014. In this revised report, the allocations to the Towns of Acton and Boxborough and the Acton-Boxborough Regional School District have changed. The total results and the results for the other units have not changed. This report summarizes the actuarial data used in the valuation, establishes the funding requirements for fiscal 2015 and later years and analyzes the preceding two years' experience.*

*This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement System. The census information and financial information on which our calculations were based was prepared by the staff of the Middlesex County Retirement System. That assistance is gratefully acknowledged.*


*The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in plan provisions or applicable law.*

*The actuarial calculations were directed under my supervision. I am a member of the American Academy of Actuaries and I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of my knowledge, the information supplied in the actuarial valuation is complete and accurate. Further, in my opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the Plan.*

*We look forward to reviewing this report at your next meeting and to answering any questions.*

*Sincerely,*

*Segal Consulting, a Member of The Segal Group, Inc.*

By:   
*Kathleen A. Riley, FSA, MAAA, EA*  
*Senior Vice President and Actuary*

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<b>VALUATION SUMMARY</b>	<b>VALUATION RESULTS</b>	<b>UNIT RESULTS</b>	<b>SUPPLEMENTAL INFORMATION</b>	<b>REPORTING INFORMATION</b>	<b>GASB INFORMATION</b>
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## SECTION 1: Valuation Summary for the Middlesex County Retirement System

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### Purpose

This report has been prepared by Segal Consulting to present a valuation of the Middlesex County Retirement System as of January 1, 2014. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The contribution requirements presented in this report are based on:

- The benefit provisions of Massachusetts General Law Chapter 32;
- The characteristics of covered active participants, inactive participants, and retired participants and beneficiaries as of January 1, 2014;
- The assets of the Plan as of December 31, 2013;
- Economic assumptions regarding future salary increases and investment earnings; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.

### Significant Issues in Valuation Year

The following key findings were the result of this actuarial valuation:

1. The actuarial valuation report as of January 1, 2014 is based on financial information as of that date. Changes in the value of assets subsequent to that date are not reflected.
2. During the plan years ended 2012 and 2013, the market value rate of return was 12.86% and 14.05%, respectively. Because the actuarial value of assets gradually recognizes market value fluctuations over a five-year period, the actuarial rate of return for the plan years ended 2012 and 2013 was 1.77% and 10.14%, respectively. The actuarial value of assets as of December 31, 2013 was \$967.1 million, or 95.4% of the market value of assets of \$1.014 billion (as reported in the Annual Statement). As of December 31, 2011, the actuarial value of assets was 109.5% of the market value of assets.
3. As indicated in Section 2, Subsection B of this report, the total unrecognized investment gain as of December 31, 2013 is \$46,867,397. This investment gain will be recognized in the determination of the actuarial value of assets for funding purposes in the next few years, to the extent it is not offset by recognition of investment losses derived from future experience. This implies that earning the assumed rate of investment return on a **market value** basis will result in investment gains on the actuarial value of assets in the next few years. The unrecognized investment gains are not reflected in the funding schedule shown in Section 2, Chart 16.

## SECTION 1: Valuation Summary for the Middlesex County Retirement System

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4. This valuation reflects the following changes in actuarial assumptions and methods:

- The actuarial cost method was changed to better reflect the impact of the plan changes effective for employees hired on or after April 2, 2012.
- The pre-retirement mortality assumption was changed from the RP-2000 Employee Mortality Table projected 12 years with Scale AA to the RP-2000 Employee Mortality Table projected 22 years with Scale AA.
- The mortality assumption for non-disabled retirees was changed from the RP-2000 Healthy Annuitant Mortality Table projected 12 years with Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected 17 years with Scale AA.
- The mortality assumption for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward two years to the RP-2000 Healthy Annuitant Mortality Table set forward three years projected 17 years with Scale AA.
- The investment return assumption was lowered from 8.00% to 7.875%.
- The salary increase assumption was changed from level rates of 4.75% per year for Group 1 and Group 2 members and 5.25% per year for Group 4 members, including an allowance for inflation of 4.5% per year, to rates based on years of service with ultimate rates of 4.25% per year for Group 1 members, 4.5% per year for Group 2 members and 4.75% per year for Group 4 members, including an allowance for inflation of 4.0% per year.
- The assumed retirement age for inactive vested participants was changed from age 65 to age 60 for Group 1 and 2 members and remained the same at age 55 for Group 4 members hired prior to April 2, 2012. For participants hired April 2, 2012 or later, the assumption is 60 for Group 1 members, 55 for Group 2 members, and 50 for Group 4 members.
- The administrative expense assumption was increased from \$3,100,000 for calendar 2012 to \$3,400,000 for calendar 2014.

The changes in assumptions and methods increased the unfunded liability by \$45.4 million and decreased the normal cost by \$2.9 million.

5. The following plan change is included in this valuation:

- Members hired on or after April 2, 2012 are covered by the provisions of Chapter 32 as amended by of Chapter 176 of the Acts of 2011 and Chapter 139 of the Acts of 2012.

## SECTION 1: Valuation Summary for the Middlesex County Retirement System

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6. The unfunded liability was expected to increase from \$1,111.8 million as of January 1, 2012 to \$1,160.9 million as of January 1, 2014. The actual unfunded liability of \$1,228.6 million is \$67.7 million greater than expected due to changes in assumptions and cost method noted above and the experience loss detailed in Section 2 of this report.
7. The recommended contribution for fiscal 2015 was set to the previously budgeted amount of \$94,523,281. In fiscal 2016 through fiscal 2020, the recommended contribution will be the prior year's budgeted amount increased 6.5%. Thereafter, the amortization payment on the unfunded liability will increase 4% per year. This will result in a total fiscal 2016 appropriation of \$100,667,294 and a total fiscal 2017 appropriation of \$107,210,668. These amounts reflect payment of the appropriation in two equal amounts on July 1 and December 31. If the appropriation is made in one payment on July 1, the amount will be lower. Under this funding schedule, the System will be fully funded by fiscal 2035, the same as the prior funding schedule. Chart 16 in Section 2 shows the detail of the funding schedule.
8. On a market value basis, the funded ratio has increased from 39.89% as of January 1, 2012 to 46.18% as of January 1, 2014. On an actuarial basis, the funded ratio has increased from 43.68% as of January 1, 2012 to 44.05% as of January 1, 2014.
9. Section 5 includes the disclosure information required by Governmental Accounting Standards Board (GASB) Statements No. 25 and 27. Section 6 shows the format of the disclosure information required by GASB Statements No. 67 and 68. The exhibits in Section 6 will be completed at the end of the year when December 31, 2014 financial information is available. At that time, the liabilities will be projected to the end of the year and the allocations to each employer will be determined.

## SECTION 1: Valuation Summary for the Middlesex County Retirement System

### Summary of Key Valuation Results

	2014	2012
<b>Contributions for fiscal year beginning July 1:</b>		
Recommended for fiscal 2015 and 2013	\$94,523,281	\$83,369,820
Recommended for fiscal 2016 and 2014	100,667,294	88,757,354
Recommended for fiscal 2017 and 2015	107,210,668	94,523,281
<b>Funding elements for plan year beginning January 1:</b>		
Normal cost, including administrative expenses	\$55,532,389	\$55,440,668
Market value of assets	1,014,013,415	787,395,962
Actuarial value of assets	967,146,018	862,323,395
Actuarial accrued liability	2,195,732,452	1,974,144,909
Unfunded actuarial accrued liability	1,228,586,434	1,111,821,514
Funded ratio based on market value of assets	46.18%	39.89%
Funded ratio based on actuarial value of assets	44.05%	43.68%
<b>Demographic data for plan year beginning January 1:</b>		
Number of retired participants and beneficiaries	5,077	4,886
Number of inactive participants entitled to a return of their employee contributions	2,632	2,708
Number of inactive participants with a vested right to a deferred or immediate benefit	384	394
Number of active participants	9,082	8,979
Total payroll*	\$398,185,255	\$375,701,790
Average payroll*	43,843	41,842

\* Payroll figures are for the prior calendar year and reflect annualized salaries for participants hired during the year.



## SECTION 2: Valuation Results for the Middlesex County Retirement System

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### A. PARTICIPANT DATA

The Actuarial Valuation and Review considers the number and demographic characteristics of covered participants, including active participants, inactive participants, retired participants and beneficiaries.

This section presents a summary of significant statistical data on these participant groups.

More detailed information for this valuation year and the preceding valuation can be found in Section 3, Exhibits A and B.

*A historical perspective of how the participant population has changed over the past eight valuations can be seen in this chart.*

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#### CHART 1

##### Participant Population: 1999 – 2013

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Year Ended December 31	Active Participants	Inactive Participants	Retired Participants and Beneficiaries
1999	8,437	1,887	4,383
2001	9,246	2,331	4,481
2003	9,043	2,913	4,780
2005	9,106	3,158	4,763
2007	9,285	3,267	4,764
2009	9,093	3,430	4,833
2011	8,979	3,102	4,886
2013	9,082	3,016	5,077

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## SECTION 2: Valuation Results for the Middlesex County Retirement System

### Active Participants

Plan costs are affected by the age, years of service and payroll of active participants. In this year's valuation, there were 9,082 active participants with an average age of 48.3, average years of service of 11.7 years and average payroll of \$43,843. The 8,979 active participants in the prior valuation had an average age of 48.3, average service of 11.4 years and average payroll of \$41,842.

Among the active participants, there were 66 participants with unknown age. The actuarial calculations were adjusted for the missing information by assuming that it was the same as information provided for other active participants with similar known characteristics.

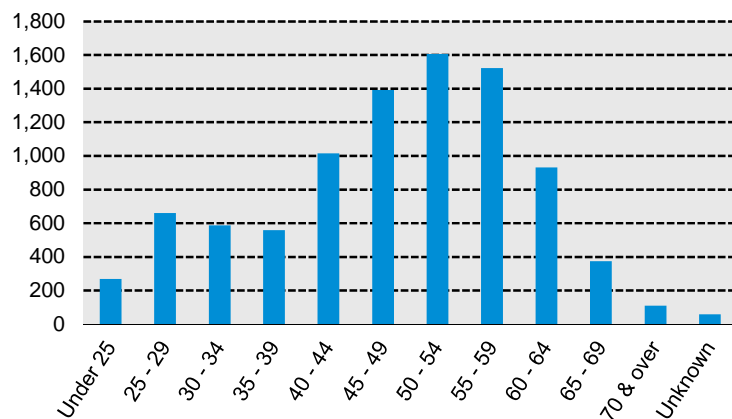
### Inactive Participants

In this year's valuation, there were 384 participants with a vested right to a deferred or immediate vested benefit and 2,632 participants entitled to a return of their employee contributions.

*These graphs show a distribution of active participants by age and by years of service.*

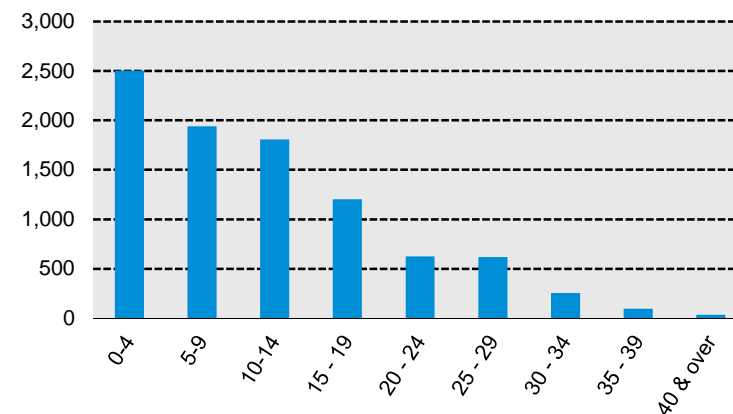
**CHART 2**

**Distribution of Active Participants by Age as of December 31, 2013**



**CHART 3**

**Distribution of Active Participants by Years of Service as of December 31, 2013**



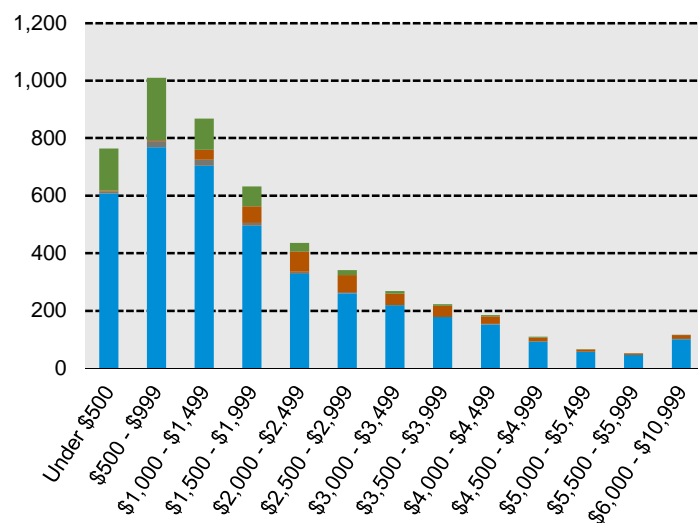
## SECTION 2: Valuation Results for the Middlesex County Retirement System

### Retired Participants and Beneficiaries

As of December 31, 2013, 4,459 retired participants and 613 beneficiaries were receiving total monthly benefits of \$9,567,934, excluding COLAs reimbursed by the Commonwealth. For comparison, in the previous valuation, there were 4,277 retired participants and 609 beneficiaries receiving monthly benefits of \$8,554,732, excluding COLAs reimbursed by the Commonwealth. There were 3 retired participants and 2 beneficiaries in suspended status this year and no suspended retired participants or beneficiaries in the prior valuation.

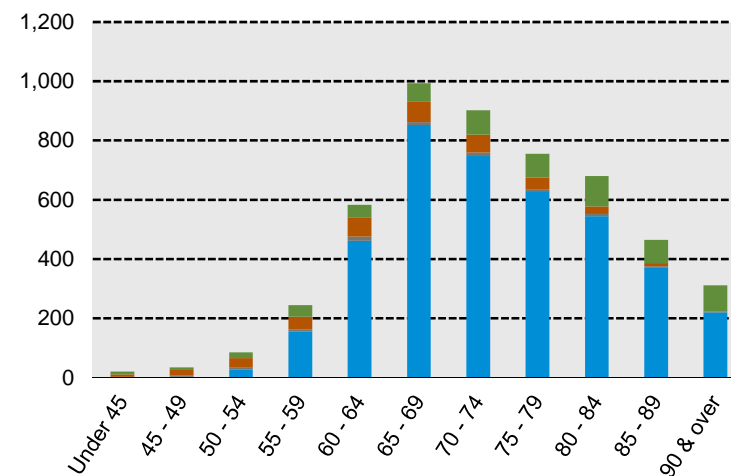
**CHART 4**

**Distribution of Retired Participants and Beneficiaries by Type and by Monthly Amount as of December 31, 2013**



**CHART 5**

**Distribution of Retired Participants and Beneficiaries by Type and by Age as of December 31, 2013**



## SECTION 2: Valuation Results for the Middlesex County Retirement System

### B. FINANCIAL INFORMATION

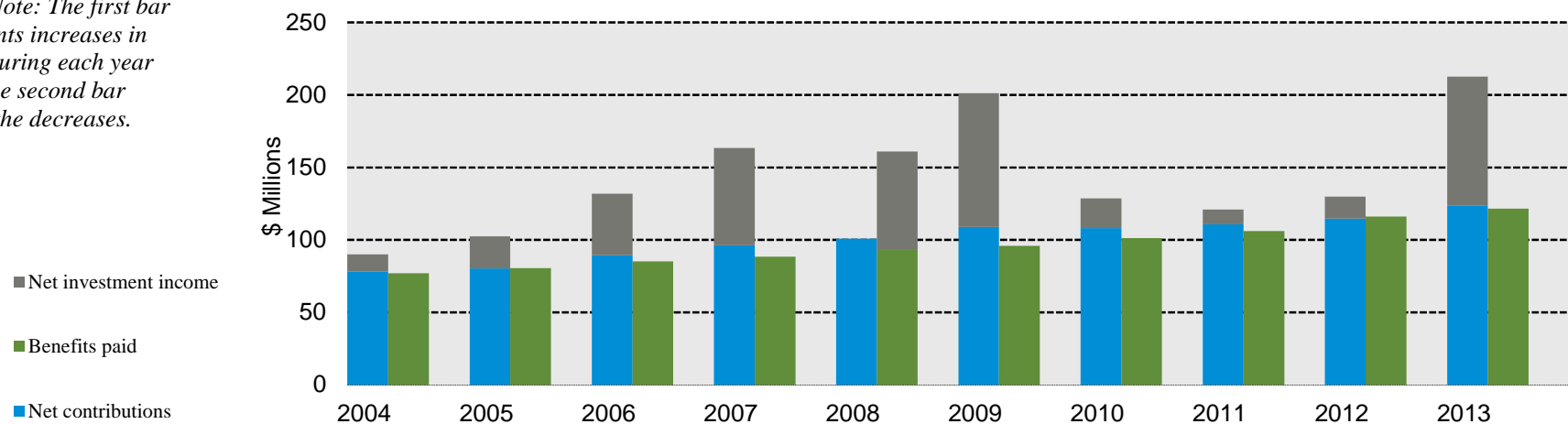
Retirement plan funding anticipates that, over the long term, both contributions (less administrative expenses) and net investment earnings (less investment fees) will be needed to cover benefit payments.

Retirement plan assets change as a result of the net impact of these income and expense components. Additional financial information, including a summary of these transactions for the valuation year, is presented in Section 4, Exhibits C and D.

*The chart depicts the components of changes in the actuarial value of assets over the last ten years. Note: The first bar represents increases in assets during each year while the second bar details the decreases.*

**CHART 6**

**Comparison of Increases and Decreases in the Actuarial Value of Assets for Years Ended December 31, 2004 – 2013**



## SECTION 2: Valuation Results for the Middlesex County Retirement System

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable.

The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

### CHART 7

#### Determination of Actuarial Value of Assets

	Year Ended	
	December 31, 2013	December 31, 2012
1. Market value of assets	\$1,014,013,415	\$887,019,156
2. Calculation of unrecognized return*		
	Original	Unrecognized
	<u>Amount</u>	<u>Return</u>
(a) Year ended December 31, 2013	\$53,733,022	N/A
(b) Year ended December 31, 2012	38,240,281	\$30,592,224
(c) Year ended December 31, 2011	-62,178,701	-37,307,221
(d) Year ended December 31, 2010	29,041,458	11,616,583
(e) Year ended December 31, 2009	30,639,098	<u>6,127,820</u>
(f) Total unrecognized return	46,867,397	11,029,406
3. Preliminary actuarial value: (1) - (2f)	967,146,018	875,989,750
4. Adjustment to be within 20% corridor	0	0
5. Final actuarial value of assets as of December 31, 2013: (3) + (4)	<u>\$967,146,018</u>	<u>\$875,989,750</u>
6. Actuarial value as a percentage of market value: (5) ÷ (1)	95.4%	98.8%

\* Unrecognized return is the difference between the total return and the expected return on a market value basis and is recognized over a five-year period.

## SECTION 2: Valuation Results for the Middlesex County Retirement System

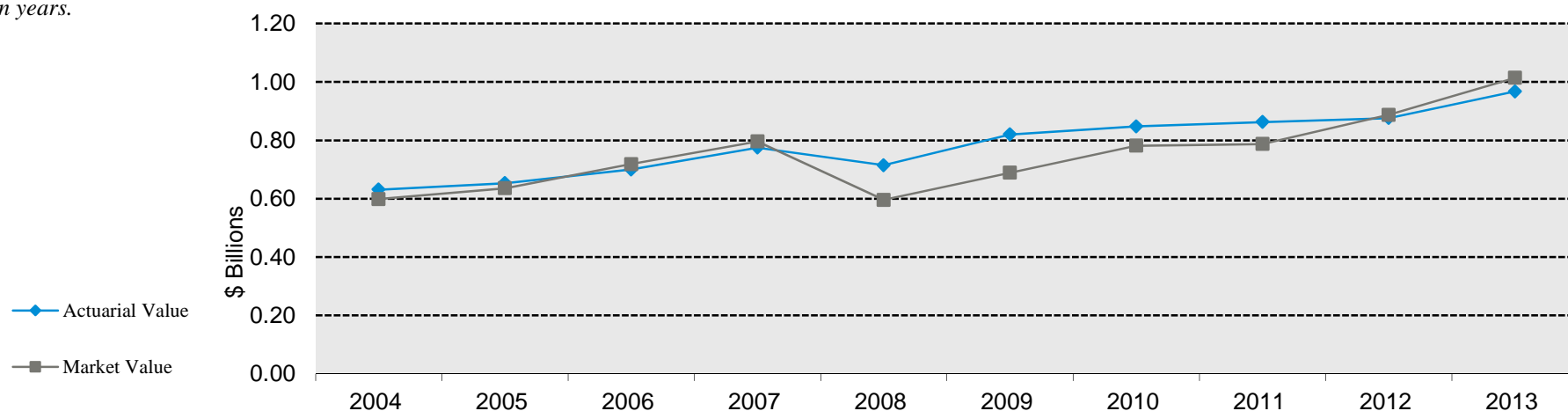
*The chart shows the determination of the actuarial value of assets as of the valuation date.*

Both the actuarial value and market value of assets are representations of the Middlesex County Retirement System's financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets. The actuarial asset value is significant because the Middlesex County Retirement System's liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

*This chart shows the change in the actuarial value of assets versus the market value over the past ten years.*

**CHART 8**

**Actuarial Value of Assets vs. Market Value of Assets as of December 31, 2004 – 2013**



## SECTION 2: Valuation Results for the Middlesex County Retirement System

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### C. ACTUARIAL EXPERIENCE

To calculate the required contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the contribution requirement will decrease from the previous year. On the other hand, the contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term

development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

The total experience loss for the two-year period ended December 31, 2013 is \$22,256,020. A discussion of the major components of the actuarial experience is on the following pages.

*This chart provides a summary of the actuarial experience over the past two years.*

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### CHART 9

#### Actuarial Experience for Two-Year Period Ended December 31, 2013

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1. Net loss from investments*	-\$39,230,229
2. Net gain from administrative expenses	254,187
3. Net gain from other experience**	<u>16,720,022</u>
4. Net experience loss: (1) + (2) + (3)	-\$22,256,020

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\* Details in Chart 10

\*\* Details in Chart 13

## SECTION 2: Valuation Results for the Middlesex County Retirement System

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### Investment Rate of Return

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Middlesex County Retirement System's investment policy. For valuation purposes, the assumed rate of return on the actuarial value of assets was 8.00% for 2013 and 2012. The actual rate of return on an actuarial basis for the 2013 and 2012 plan years was 10.14% and 1.77%, respectively.

Since the actual return for the two-year period was less than the assumed return, the Middlesex County Retirement System experienced an actuarial loss of \$39,230,229 (including an adjustment for interest) during the two-year period ending December 31, 2013 with regard to its investments.

*This chart shows the gain/(loss) due to investment experience.*

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### CHART 10 Actuarial Value Investment Experience

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	Year Ended	
	December 31, 2013	December 31, 2012
1. Actual return	\$88,945,014	\$15,213,243
2. Average value of assets	877,095,377	861,549,951
3. Actual rate of return: (1) ÷ (2)	10.14%	1.77%
4. Assumed rate of return	8.00%	8.00%
5. Expected return: (2) x (4)	\$70,167,630	\$68,923,996
6. Actuarial gain/(loss): (1) – (5)	<u>\$18,777,384</u>	<u>-\$53,710,753</u>

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## SECTION 2: Valuation Results for the Middlesex County Retirement System

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis compared to the market value investment return for the last ten years, including five-year and ten-year averages.

Based upon this experience and future expectations, we have lowered the assumed rate of return from 8.00% to 7.875%.

### CHART 11

#### Investment Return – Actuarial Value vs. Market Value: 2004 - 2013

Year Ended December 31	Actuarial Value Investment Return		Market Value Investment Return	
	Amount	Percent	Amount	Percent
2004	\$11,844,337	1.91%	\$56,737,116	10.49%
2005	22,046,916	3.49	37,630,422	6.29
2006	42,522,819	6.49	78,230,492	12.26
2007	67,081,999	9.53	69,754,061	9.66
2008	-68,010,444	-8.73	-208,326,323	-26.04
2009	92,107,036	12.77	80,318,175	13.34
2010	20,487,695	2.49	85,309,569	12.32
2011	10,333,913	1.22	1,488,563	0.19
2012	15,213,243	1.77	101,170,082	12.86
2013	<u>88,945,014</u>	10.14	<u>124,783,005</u>	14.05
Total	\$302,572,528		\$427,095,162	
	Five-year average return	5.49%		10.47%
	Ten-year average return	4.02%		6.06%

*Note: Investment returns for 2007 and earlier are net of investment and administrative expenses. Returns for 2008 and later are net of investment expenses only.*

## SECTION 2: Valuation Results for the Middlesex County Retirement System

Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the market value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan costs.

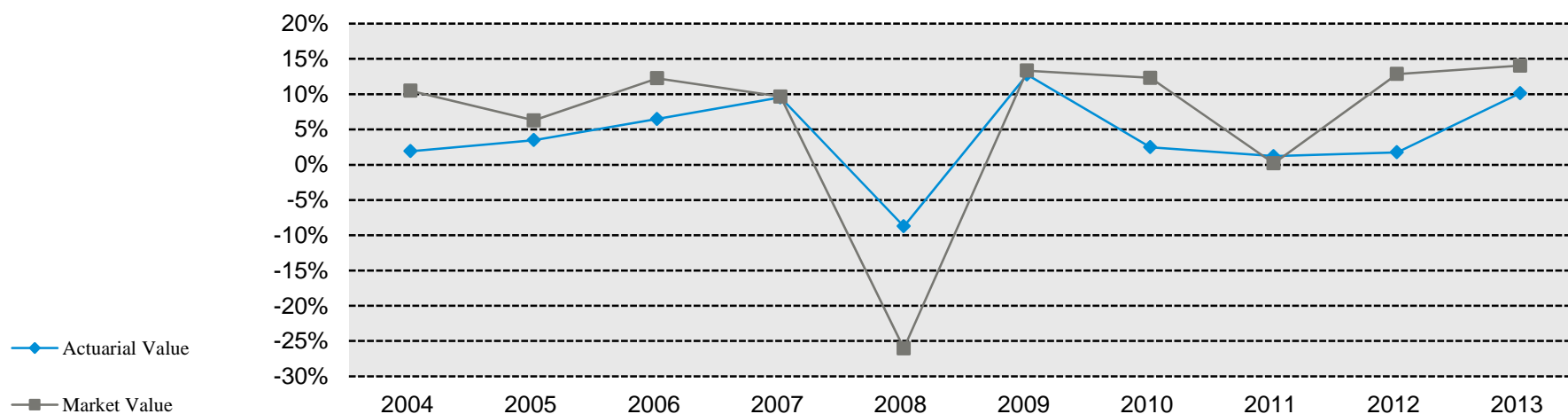
### Administrative Expenses

Administrative expenses for the years ended December 31, 2012 and 2013 were \$3,051,893 and \$3,170,834, respectively, compared to the assumption of \$3,100,000 for calendar 2012 and \$3,239,500 for calendar 2013. This resulted in a gain of \$254,187 for the two-year period, including an adjustment for interest. Based on discussions with the staff of the Middlesex County Retirement System, we have increased the assumption from \$3,100,000 to \$3,400,000 for calendar year 2014.

*This chart illustrates how this leveling effect has actually worked over the years 2004 - 2013.*

**CHART 12**

**Market and Actuarial Rates of Return for Years Ended December 31, 2004 - 2013**



## SECTION 2: Valuation Results for the Middlesex County Retirement System

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### Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among the participants,
- retirement experience (earlier or later than expected),
- mortality (more or fewer deaths than expected),
- the number of disability retirements, and
- salary increases different than assumed.

The net gain from this other experience for the two-year period ending December 31, 2013 amounted to \$16,720,022, which is 0.8% of the actuarial accrued liability.

A brief summary of the demographic gain/(loss) experience of the Middlesex County Retirement System for the two-year period ending December 31, 2013 is shown in the chart below.

*The chart shows elements of the experience gain/(loss) for the most recent years.*

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### CHART 13

#### Experience Due to Changes in Demographics for Two-Year Period Ended December 31, 2013

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1. Salary increases less than expected for continuing actives	\$36,979,108
2. Fewer deaths than expected amongst retired members and beneficiaries	-4,487,590
3. Loss from net 3(8)(c) reimbursements	-10,282,910
4. Miscellaneous loss	<u>-5,488,586</u>
5. Net experience gain	\$16,720,022

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## SECTION 2: Valuation Results for the Middlesex County Retirement System

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This valuation reflects the following changes in actuarial assumptions and methods:

- The actuarial cost method was changed to better reflect the impact of the plan changes effective for employees hired on or after April 2, 2012.
- The pre-retirement mortality assumption was changed from the RP-2000 Employee Mortality Table projected 12 years with Scale AA to the RP-2000 Employee Mortality Table projected 22 years with Scale AA.
- The mortality assumption for non-disabled retirees was changed from the RP-2000 Healthy Annuitant Mortality Table projected 12 years with Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected 17 years with Scale AA.
- The mortality assumption for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward two years to the RP-2000 Healthy Annuitant Mortality Table set forward three years projected 17 years with Scale AA.
- The investment return assumption was lowered from 8.00% to 7.875%.
- The salary increase assumption was changed from level rates of 4.75% per year for Group 1 and Group 2 members and 5.25% per year for Group 4 members, including an allowance for inflation of 4.5% per year, to rates based on years of service with ultimate rates of 4.25% per year for Group 1 members, 4.5% per year for Group 2 members and 4.75% per year for Group 4 members, including an allowance for inflation of 4.0% per year.

- The assumed retirement age for inactive vested participants was changed from age 65 to age 60 for Group 1 and 2 members and remained the same at age 55 for Group 4 members hired prior to April 2, 2012. For participants hired April 2, 2012 or later, the assumption is 60 for Group 1 members, 55 for Group 2 members, and 50 for Group 4 members.
- The administrative expense assumption was increased from \$3,100,000 for calendar 2012 to \$3,400,000 for calendar 2014.

The changes in assumptions and methods increased the unfunded liability by \$45.4 million and decreased the normal cost by \$2.9 million.

The following plan change is included in this valuation:

- Members hired on or after April 2, 2012 are covered by the provisions of Chapter 32 as amended by of Chapter 176 of the Acts of 2011 and Chapter 139 of the Acts of 2012.

## SECTION 2: Valuation Results for the Middlesex County Retirement System

Chart 14 below provides a reconciliation of the unfunded liability from the prior valuation to the current valuation.

The unfunded liability was expected to increase from \$1,111.8 million as of January 1, 2012 to \$1,160.9 million as of January 1, 2014. The actual unfunded liability as of January 1, 2014 of \$1,228.6 million is \$67.7 million higher than expected as detailed in Chart 14 below.

### CHART 14

#### Development of Unfunded Actuarial Accrued Liability and (Gain)/Loss

	Year Ended	
	December 31, 2013	December 31, 2012
1. Unfunded actuarial accrued liability at beginning of year	\$1,138,687,942	\$1,111,821,514
2. Normal cost at beginning of year	57,935,498	55,440,668
3. Total contributions	-126,856,080	-117,699,528
4. Interest		
(a) For whole year on (1) + (2)	\$95,729,876	\$93,380,974
(b) For half year on (3)	<u>-4,586,762</u>	<u>-4,255,686</u>
(c) Total interest	<u>91,143,114</u>	<u>89,125,288</u>
5. Expected unfunded actuarial accrued liability	\$1,160,910,474	\$1,138,687,942
6. Changes due to:		
(a) Experience loss	\$22,256,020	--
(b) Assumption and method changes	<u>45,419,940</u>	--
(c) Total changes	<u>67,675,960</u>	--
7. Unfunded actuarial accrued liability at end of year: (5) + (6c)	<u>\$1,228,586,434</u>	--

## SECTION 2: Valuation Results for the Middlesex County Retirement System

### D. RECOMMENDED CONTRIBUTION

The amount of annual contribution required to fund the Plan is comprised of an employer normal cost payment and a payment on the unfunded actuarial accrued liability.

The recommended contribution for fiscal 2015 was set to the previously budgeted amount of \$94,523,281. In fiscal 2016 through fiscal 2020, the recommended contribution will be the prior year's budgeted amount increased 6.5%. Thereafter, the amortization payment on the unfunded liability will increase 4% per year. This will result in a total fiscal 2016 appropriation of \$100,667,294 and a total fiscal

2017 appropriation of \$107,210,668. These amounts reflect payment of the appropriation in two equal amounts on July 1 and December 31. If the appropriation is made in one payment on July 1, the amount will be lower. Under this funding schedule, the System will be fully funded by fiscal 2035, the same as the prior funding schedule. Chart 16 on the following page shows the detail of the funding schedule.

*The chart compares this valuation's recommended contribution with the prior valuation.*

### CHART 15

#### Recommended Contribution

	Year Beginning January 1			
	2014		2012	
	Amount	% of Payroll	Amount	% of Payroll
1. Total normal cost	\$52,132,389	12.54%	\$52,340,668	13.31%
2. Administrative expenses	3,400,000	0.82%	3,100,000	0.79%
3. Expected employee contributions	<u>-39,232,068</u>	<u>-9.44%</u>	<u>-36,374,092</u>	<u>-9.25%</u>
4. Employer normal cost: (1) + (2) + (3)	\$16,300,321	3.92%	\$19,066,576	4.85%
5. Actuarial accrued liability	2,195,732,452		1,974,144,909	
6. Actuarial value of assets	<u>967,146,018</u>		<u>862,323,395</u>	
7. Unfunded actuarial accrued liability: (5) - (6)	\$1,228,586,434		\$1,111,821,514	
8. Employer normal cost projected to July 1, 2014 and 2012, adjusted for timing*	16,941,148	4.00%	19,869,502	4.94%
9. Projected unfunded actuarial accrued liability	1,276,045,381		1,155,438,811	
10. Payment on projected unfunded actuarial accrued liability, adjusted for timing*	77,582,133	18.29%	63,500,318	15.81%
11. Total recommended contribution: (8) + (10)	<u>\$94,523,281</u>	<u>22.29%</u>	<u>\$83,369,820</u>	<u>20.75%</u>
12. Projected payroll	\$423,986,338		\$401,848,441	

\* Recommended contributions are assumed to be paid in two equal installments on July 1 and December 31.

## SECTION 2: Valuation Results for the Middlesex County Retirement System

**CHART 16**

Fully funded by 2035 with appropriations that increase 6.5% per year from fiscal 2016 through fiscal 2020 and lower increases thereafter

(1) Fiscal Year Ended June 30	(2) Employer Normal Cost	(3) Amortization of 2002 ERI Liability	(4) Amortization of 2003 ERI Liability	(5) Amortization of 2010 ERI Liability	(6) Amortization of Remaining Unfunded Liability	(7) Total Plan Cost: (2) + (3) + (4) + (5) + (6)	(8) Total Unfunded Actuarial Accrued Liability at Beginning of Fiscal Year	(9) Percent Increase in Total Cost
2015	\$16,941,148	\$1,676,175	\$733,735	\$60,947	\$75,111,276	\$94,523,281	\$1,276,045,381	-
2016	17,618,794	1,676,175	733,735	60,947	80,577,643	100,667,294	1,294,413,316	6.50%
2017	18,323,546	1,676,175	733,735	60,947	86,416,265	107,210,668	1,308,441,579	6.50%
2018	19,056,488	1,676,175	733,735	60,947	92,652,016	114,179,361	1,317,394,390	6.50%
2019	19,818,748	1,676,175	733,735	60,947	99,311,414	121,601,019	1,320,451,696	6.50%
2020	20,611,498	-	733,735	60,947	108,098,905	129,505,085	1,316,700,797	6.50%
2021	21,435,958	-	-	60,947	113,124,012	134,620,917	1,305,127,191	3.95%
2022	22,293,396	-	-	60,947	117,648,972	140,003,315	1,288,099,749	4.00%
2023	23,185,132	-	-	-	122,354,931	145,540,063	1,264,941,728	3.95%
2024	24,112,537	-	-	-	127,249,128	151,361,665	1,235,043,271	4.00%
2025	25,077,038	-	-	-	132,339,094	157,416,132	1,197,609,806	4.00%
2026	26,080,120	-	-	-	137,632,657	163,712,777	1,151,840,730	4.00%
2027	27,123,325	-	-	-	143,137,964	170,261,289	1,096,864,106	4.00%
2028	28,208,258	-	-	-	148,863,482	177,071,740	1,031,730,709	4.00%
2029	29,336,588	-	-	-	154,818,022	184,154,610	955,407,599	4.00%
2030	30,510,052	-	-	-	161,010,742	191,520,794	866,771,168	4.00%
2031	31,730,454	-	-	-	167,451,172	199,181,626	764,599,627	4.00%
2032	32,999,672	-	-	-	174,149,219	207,148,891	647,564,886	4.00%
2033	34,319,659	-	-	-	181,115,188	215,434,847	514,223,781	4.00%
2034	35,692,445	-	-	-	188,359,796	224,052,241	363,008,590	4.00%
2035	37,120,143	-	-	-	195,894,187	233,014,330	192,216,790	4.00%
2036	38,604,949	-	-	-	-	38,604,949	-	-83.43%
2037	40,149,147	-	-	-	-	40,149,147	-	4.00%
2038	41,755,113	-	-	-	-	41,755,113	-	4.00%
2039	43,425,318	-	-	-	-	43,425,318	-	4.00%
2040	45,162,331	-	-	-	-	45,162,331	-	4.00%

Notes: Recommended contributions are assumed to be paid in two equal installments on July 1 and December 31.

Item (2) increases at 4.0% per year. Item (6) increases 4% per year beginning in fiscal 2022.

Fiscal 2015 appropriation is budgeted amount determined with prior valuation.

Projected unfunded actuarial accrued liability does not reflect deferred investment gains.

Projected normal cost does not reflect the future impact of pension reform for new hires.

### SECTION 3: Unit Results for the Middlesex County Retirement System

#### Unit Results

##### Summary of Actuarial Valuation Results for Total

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 613 beneficiaries in pay status, 3 retired participants in suspended status and 2 beneficiaries in suspended status)	5,077
2. Participants active during the year ended December 31, 2013	9,082
3. Inactive participants entitled to a return of their employee contributions	2,632
4. Inactive participants with a vested right to a deferred or immediate benefit	384

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$52,132,389
2. Administrative expenses		3,400,000
3. Expected employee contributions		<u>-39,232,068</u>
4. Employer normal cost: (1) + (2) + (3)		\$16,300,321
5. Actuarial accrued liability		2,195,732,452
Retired participants and beneficiaries	\$1,076,311,992	
Active participants	1,084,015,968	
Inactive participants	35,404,492	
6. Actuarial value of assets		967,146,018
7. Unfunded actuarial accrued liability: (5) - (6)		\$1,228,586,434

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	\$16,941,148	4.00%
2. Projected unfunded actuarial accrued liability	1,276,045,381	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	75,111,276	
4. Payment on 2002 ERI, adjusted for timing	1,676,175	
5. Payment on 2003 ERI, adjusted for timing	733,735	
6. Payment on 2010 ERI, adjusted for timing	<u>60,947</u>	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$94,523,281	22.29%
8. Total FY15 Appropriation, payable on July 1	92,722,013	21.87%
9. Projected payroll	423,986,338	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing, adjusted for timing	\$17,618,794	\$18,323,546
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	80,577,643	86,416,265
3. Payment on 2002 ERI, adjusted for timing	1,676,175	1,676,175
4. Payment on 2003 ERI, adjusted for timing	733,735	733,735
5. Payment on 2010 ERI, adjusted for timing	<u>60,947</u>	<u>60,947</u>
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$100,667,294	\$107,210,668
7. Total Appropriation, payable on July 1	98,777,539	105,198,076

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.



### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Middlesex County Retirement Board

1

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	10
2. Participants active during the year ended December 31, 2013	22
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$137,548
2. Administrative expenses		8,971
3. Expected employee contributions		-133,257
4. Employer normal cost: (1) + (2) + (3)		\$13,262
5. Actuarial accrued liability		7,307,796
Retired participants and beneficiaries	\$2,781,380	
Active participants	4,526,416	
Inactive participants	0	
6. Actuarial value of assets		3,011,714
7. Unfunded actuarial accrued liability: (5) - (6)		\$4,296,082

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing, adjusted for timing	\$13,783	0.96%
2. Projected unfunded actuarial accrued liability	4,462,035	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	271,306	
4. Payment on 2002 ERI, adjusted for timing	8,400	
5. Payment on 2003 ERI, adjusted for timing	20,365	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$313,854	21.83%
8. Total FY15 Appropriation, payable on July 1	307,873	21.42%
9. Projected payroll	1,437,464	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing, adjusted for timing	\$14,334	\$14,907
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	274,633	294,533
3. Payment on 2002 ERI, adjusted for timing	8,400	8,400
4. Payment on 2003 ERI, adjusted for timing	20,365	20,365
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$317,732	\$338,205
7. Total Appropriation, payable on July 1	311,767	331,856

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Middlesex County

100

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 69 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	182
2. Participants active during the year ended December 31, 2013	0
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	1

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$0
2. Administrative expenses		0
3. Expected employee contributions		<u>-0</u>
4. Employer normal cost: (1) + (2) + (3)		\$0
5. Actuarial accrued liability		21,262,482
Retired participants and beneficiaries	\$21,209,993	
Active participants	0	
Inactive participants	52,489	
6. Actuarial value of assets		21,262,482
7. Unfunded actuarial accrued liability: (5) - (6)		\$0

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing, adjusted for timing	\$0	0.00%
2. Projected unfunded actuarial accrued liability	0	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	0	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	<u>0</u>	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$0	0.00%
8. Total FY15 Appropriation, payable on July 1	0	0.00%
9. Projected payroll	0	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing, adjusted for timing	\$0	\$0
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	0	0
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	<u>0</u>	<u>0</u>
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$0	\$0
7. Total Appropriation, payable on July 1	0	0

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Middlesex Hospital

200

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 4 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	95
2. Participants active during the year ended December 31, 2013	0
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$0
2. Administrative expenses		0
3. Expected employee contributions		<u>-0</u>
4. Employer normal cost: (1) + (2) + (3)		\$0
5. Actuarial accrued liability		10,552,765
Retired participants and beneficiaries	\$10,552,765	
Active participants	0	
Inactive participants	0	
6. Actuarial value of assets		10,552,765
7. Unfunded actuarial accrued liability: (5) - (6)		\$0

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$0	0.00%
2. Projected unfunded actuarial accrued liability	0	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	0	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	<u>0</u>	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$0	0.00%
8. Total FY15 Appropriation, payable on July 1	0	0.00%
9. Projected payroll	0	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$0	\$0
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	0	0
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	<u>0</u>	<u>0</u>
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$0	\$0
7. Total Appropriation, payable on July 1	0	0

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Acton

300

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 16 beneficiaries in pay status)	167
2. Participants active during the year ended December 31, 2013	196
3. Inactive participants entitled to a return of their employee contributions	54
4. Inactive participants with a vested right to a deferred or immediate benefit	15

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost	\$1,562,102
2. Administrative expenses	101,877
3. Expected employee contributions	<u>-1,186,983</u>
4. Employer normal cost: (1) + (2) + (3)	\$476,996
5. Actuarial accrued liability	76,375,360
Retired participants and beneficiaries	\$38,536,034
Active participants	36,737,337
Inactive participants	1,101,989
6. Actuarial value of assets	34,705,405
7. Unfunded actuarial accrued liability: (5) - (6)	\$41,669,955

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	\$495,748	3.87%
2. Projected unfunded actuarial accrued liability	43,279,620	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	2,065,641	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$2,561,389	20.02%
8. Total FY15 Appropriation, payable on July 1	2,512,578	19.64%
9. Projected payroll	12,794,946	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing	\$515,578	\$536,201
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	2,790,365	2,992,553
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$3,305,943	\$3,528,754
7. Total Appropriation, payable on July 1	3,243,883	3,462,510

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Ashby

400

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	8
2. Participants active during the year ended December 31, 2013	21
3. Inactive participants entitled to a return of their employee contributions	6
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$137,590
2. Administrative expenses		8,973
3. Expected employee contributions		<u>-84,516</u>
4. Employer normal cost: (1) + (2) + (3)		\$62,047
5. Actuarial accrued liability		3,312,187
Retired participants and beneficiaries	\$1,106,444	
Active participants	2,180,702	
Inactive participants	25,041	
6. Actuarial value of assets		1,809,057
7. Unfunded actuarial accrued liability: (5) - (6)		\$1,503,130

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$64,486	7.10%
2. Projected unfunded actuarial accrued liability	1,561,194	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	88,813	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$153,299	16.88%
8. Total FY15 Appropriation, payable on July 1	150,378	16.56%
9. Projected payroll	908,347	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$67,065	\$69,748
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	99,706	106,930
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$166,771	\$176,678
7. Total Appropriation, payable on July 1	163,640	173,361

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Ashland

500

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 13 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	110
2. Participants active during the year ended December 31, 2013	266
3. Inactive participants entitled to a return of their employee contributions	140
4. Inactive participants with a vested right to a deferred or immediate benefit	10

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$1,393,654
2. Administrative expenses		90,892
3. Expected employee contributions		<u>-1,062,868</u>
4. Employer normal cost: (1) + (2) + (3)		\$421,678
5. Actuarial accrued liability		52,111,589
Retired participants and beneficiaries	\$24,134,448	
Active participants	26,589,660	
Inactive participants	1,387,481	
6. Actuarial value of assets		26,341,431
7. Unfunded actuarial accrued liability: (5) - (6)		\$25,770,158

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$438,256	3.83%
2. Projected unfunded actuarial accrued liability	26,765,631	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,575,337	
4. Payment on 2002 ERI, adjusted for timing	180,741	
5. Payment on 2003 ERI, adjusted for timing	55,191	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$2,249,525	19.65%
8. Total FY15 Appropriation, payable on July 1	2,206,657	19.27%
9. Projected payroll	11,449,438	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$455,786	\$474,017
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,635,713	1,754,236
3. Payment on 2002 ERI, adjusted for timing	180,741	180,741
4. Payment on 2003 ERI, adjusted for timing	55,191	55,191
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$2,327,431	\$2,464,185
7. Total Appropriation, payable on July 1	2,283,740	2,417,927

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Ayer

600

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 17 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	75
2. Participants active during the year ended December 31, 2013	92
3. Inactive participants entitled to a return of their employee contributions	31
4. Inactive participants with a vested right to a deferred or immediate benefit	8

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$703,267
2. Administrative expenses		45,866
3. Expected employee contributions		<u>-493,865</u>
4. Employer normal cost: (1) + (2) + (3)		\$255,268
5. Actuarial accrued liability		29,947,806
Retired participants and beneficiaries	\$13,992,310	
Active participants	15,389,189	
Inactive participants	566,307	
6. Actuarial value of assets		13,700,185
7. Unfunded actuarial accrued liability: (5) - (6)		\$16,247,621

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$265,304	5.02%
2. Projected unfunded actuarial accrued liability	16,875,249	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,071,943	
4. Payment on 2002 ERI, adjusted for timing	15,811	
5. Payment on 2003 ERI, adjusted for timing	17,209	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$1,370,267	25.92%
8. Total FY15 Appropriation, payable on July 1	1,344,155	25.43%
9. Projected payroll	5,286,548	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$275,916	\$286,953
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,060,055	1,136,866
3. Payment on 2002 ERI, adjusted for timing	15,811	15,811
4. Payment on 2003 ERI, adjusted for timing	17,209	17,209
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$1,368,991	\$1,456,839
7. Total Appropriation, payable on July 1	1,343,292	1,429,491

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Bedford

700

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 18 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	175
2. Participants active during the year ended December 31, 2013	332
3. Inactive participants entitled to a return of their employee contributions	152
4. Inactive participants with a vested right to a deferred or immediate benefit	16

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$1,960,094
2. Administrative expenses		127,835
3. Expected employee contributions		<u>-1,548,034</u>
4. Employer normal cost: (1) + (2) + (3)		\$539,895
5. Actuarial accrued liability		79,345,829
Retired participants and beneficiaries	\$36,342,936	
Active participants	41,847,709	
Inactive participants	1,155,184	
6. Actuarial value of assets		34,429,452
7. Unfunded actuarial accrued liability: (5) - (6)		\$44,916,377

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$561,121	3.39%
2. Projected unfunded actuarial accrued liability	46,651,447	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	2,877,338	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$3,438,459	20.80%
8. Total FY15 Appropriation, payable on July 1	3,372,935	20.40%
9. Projected payroll	16,531,281	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$583,566	\$606,909
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	2,964,564	3,179,375
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$3,548,130	\$3,786,284
7. Total Appropriation, payable on July 1	3,481,523	3,715,207

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.



### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Billerica

800

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 63 beneficiaries in pay status, no retired participants in suspended status and 1 beneficiary in suspended status)	422
2. Participants active during the year ended December 31, 2013	608
3. Inactive participants entitled to a return of their employee contributions	81
4. Inactive participants with a vested right to a deferred or immediate benefit	13

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$3,899,288
2. Administrative expenses		254,307
3. Expected employee contributions		<u>-2,850,020</u>
4. Employer normal cost: (1) + (2) + (3)		\$1,303,575
5. Actuarial accrued liability		194,660,846
Retired participants and beneficiaries	\$106,650,776	
Active participants	86,805,440	
Inactive participants	1,204,630	
6. Actuarial value of assets		74,245,318
7. Unfunded actuarial accrued liability: (5) - (6)		\$120,415,528

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$1,354,820	4.40%
2. Projected unfunded actuarial accrued liability	125,067,047	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	7,352,377	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$8,707,197	28.30%
8. Total FY15 Appropriation, payable on July 1	8,541,269	27.76%
9. Projected payroll	30,772,798	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$1,409,019	\$1,465,378
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	7,971,631	8,549,255
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$9,380,650	\$10,014,633
7. Total Appropriation, payable on July 1	9,204,554	9,826,635

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Boxborough

900

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 4 beneficiaries in pay status)	29
2. Participants active during the year ended December 31, 2013	52
3. Inactive participants entitled to a return of their employee contributions	20
4. Inactive participants with a vested right to a deferred or immediate benefit	7

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$372,430
2. Administrative expenses		24,289
3. Expected employee contributions		<u>-266,289</u>
4. Employer normal cost: (1) + (2) + (3)		\$130,430
5. Actuarial accrued liability		13,871,063
Retired participants and beneficiaries	\$5,997,079	
Active participants	7,071,113	
Inactive participants	802,871	
6. Actuarial value of assets		6,342,561
7. Unfunded actuarial accrued liability: (5) - (6)		\$7,528,502

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	\$135,558	4.78%
2. Projected unfunded actuarial accrued liability	7,819,320	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	420,824	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$556,382	19.61%
8. Total FY15 Appropriation, payable on July 1	545,779	19.23%
9. Projected payroll	2,837,600	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing	\$140,980	\$146,619
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	500,974	537,274
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$641,954	\$683,893
7. Total Appropriation, payable on July 1	629,903	671,055

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Burlington

1000

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 30 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	321
2. Participants active during the year ended December 31, 2013	533
3. Inactive participants entitled to a return of their employee contributions	141
4. Inactive participants with a vested right to a deferred or immediate benefit	16

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$3,673,530
2. Administrative expenses		239,582
3. Expected employee contributions		<u>-2,774,172</u>
4. Employer normal cost: (1) + (2) + (3)		\$1,138,940
5. Actuarial accrued liability		167,621,768
Retired participants and beneficiaries	\$82,433,566	
Active participants	83,514,530	
Inactive participants	1,673,672	
6. Actuarial value of assets		68,181,947
7. Unfunded actuarial accrued liability: (5) - (6)		\$99,439,821

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$1,183,717	3.97%
2. Projected unfunded actuarial accrued liability	103,281,072	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	6,137,216	
4. Payment on 2002 ERI, adjusted for timing	265,231	
5. Payment on 2003 ERI, adjusted for timing	71,060	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$7,657,224	25.71%
8. Total FY15 Appropriation, payable on July 1	7,511,305	25.22%
9. Projected payroll	29,788,703	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$1,231,066	\$1,280,309
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	6,478,988	6,948,453
3. Payment on 2002 ERI, adjusted for timing	265,231	265,231
4. Payment on 2003 ERI, adjusted for timing	71,060	71,060
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$8,046,345	\$8,565,053
7. Total Appropriation, payable on July 1	7,895,297	8,404,267

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Carlisle

1100

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 1 beneficiary in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	32
2. Participants active during the year ended December 31, 2013	101
3. Inactive participants entitled to a return of their employee contributions	47
4. Inactive participants with a vested right to a deferred or immediate benefit	9

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$580,853	
2. Administrative expenses		37,882	
3. Expected employee contributions		<u>-420,343</u>	
4. Employer normal cost: (1) + (2) + (3)		\$198,392	
5. Actuarial accrued liability			18,292,190
Retired participants and beneficiaries	\$6,166,070		
Active participants	11,120,942		
Inactive participants	1,005,178		
6. Actuarial value of assets			9,876,705
7. Unfunded actuarial accrued liability: (5) - (6)			\$8,415,485

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$206,192	4.45%
2. Projected unfunded actuarial accrued liability	8,740,566	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	520,417	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$726,609	15.69%
8. Total FY15 Appropriation, payable on July 1	712,762	15.39%
9. Projected payroll	4,632,054	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$214,440	\$223,018
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	556,677	597,014
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$771,117	\$820,032
7. Total Appropriation, payable on July 1	756,641	804,638

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Chelmsford

1200

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 51 beneficiaries in pay status, no retired participants in suspended status and 1 beneficiary in suspended status)	415
2. Participants active during the year ended December 31, 2013	547
3. Inactive participants entitled to a return of their employee contributions	101
4. Inactive participants with a vested right to a deferred or immediate benefit	25

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$3,050,933
2. Administrative expenses		198,977
3. Expected employee contributions		<u>-2,181,113</u>
4. Employer normal cost: (1) + (2) + (3)		\$1,068,797
5. Actuarial accrued liability		140,494,440
Retired participants and beneficiaries	\$80,821,937	
Active participants	58,018,621	
Inactive participants	1,653,882	
6. Actuarial value of assets		52,115,409
7. Unfunded actuarial accrued liability: (5) - (6)		\$88,379,031

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$1,110,816	4.71%
2. Projected unfunded actuarial accrued liability	91,793,016	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	5,200,511	
4. Payment on 2002 ERI, adjusted for timing	298,335	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$6,609,662	28.01%
8. Total FY15 Appropriation, payable on July 1	6,483,706	27.48%
9. Projected payroll	23,594,774	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$1,155,249	\$1,201,459
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	5,778,213	6,196,899
3. Payment on 2002 ERI, adjusted for timing	298,335	298,335
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$7,231,797	\$7,696,693
7. Total Appropriation, payable on July 1	7,096,040	7,552,208

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Dracut

1300

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 18 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	195
2. Participants active during the year ended December 31, 2013	331
3. Inactive participants entitled to a return of their employee contributions	30
4. Inactive participants with a vested right to a deferred or immediate benefit	7

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$1,887,818
2. Administrative expenses		123,121
3. Expected employee contributions		<u>-1,303,995</u>
4. Employer normal cost: (1) + (2) + (3)		\$706,944
5. Actuarial accrued liability		87,308,209
Retired participants and beneficiaries	\$46,158,284	
Active participants	40,790,982	
Inactive participants	358,943	
6. Actuarial value of assets		37,632,546
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$49,675,663</u>

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	\$734,737	5.14%
2. Projected unfunded actuarial accrued liability	51,594,579	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	3,129,968	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$3,864,705	27.03%
8. Total FY15 Appropriation, payable on July 1	3,791,058	26.51%
9. Projected payroll	14,300,018	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing	\$764,126	\$794,691
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	3,282,153	3,519,977
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$4,046,279	\$4,314,668
7. Total Appropriation, payable on July 1	3,970,321	4,233,672

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Dunstable

1400

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	8
2. Participants active during the year ended December 31, 2013	22
3. Inactive participants entitled to a return of their employee contributions	2
4. Inactive participants with a vested right to a deferred or immediate benefit	2

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$156,056
2. Administrative expenses		10,178
3. Expected employee contributions		<u>-100,302</u>
4. Employer normal cost: (1) + (2) + (3)		\$65,932
5. Actuarial accrued liability		4,170,506
Retired participants and beneficiaries	\$1,404,207	
Active participants	2,759,949	
Inactive participants	6,350	
6. Actuarial value of assets		1,934,277
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$2,236,229</u>

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$68,524	6.33%
2. Projected unfunded actuarial accrued liability	2,322,612	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	134,052	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$202,576	18.72%
8. Total FY15 Appropriation, payable on July 1	198,716	18.36%
9. Projected payroll	1,082,176	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$71,265	\$74,116
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	148,206	158,945
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$219,471	\$233,061
7. Total Appropriation, payable on July 1	215,351	228,686

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Groton

1500

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 9 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	67
2. Participants active during the year ended December 31, 2013	108
3. Inactive participants entitled to a return of their employee contributions	17
4. Inactive participants with a vested right to a deferred or immediate benefit	5

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$876,596	
2. Administrative expenses		57,170	
3. Expected employee contributions		<u>-647,959</u>	
4. Employer normal cost: (1) + (2) + (3)		\$285,807	
5. Actuarial accrued liability			32,098,898
Retired participants and beneficiaries	\$16,964,863		
Active participants	14,596,992		
Inactive participants	537,043		
6. Actuarial value of assets			12,374,187
7. Unfunded actuarial accrued liability: (5) - (6)			\$19,724,711

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$297,043	4.40%
2. Projected unfunded actuarial accrued liability	20,486,655	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,084,634	
4. Payment on 2002 ERI, adjusted for timing	189,931	
5. Payment on 2003 ERI, adjusted for timing	19,415	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$1,591,023	23.54%
8. Total FY15 Appropriation, payable on July 1	1,560,704	23.09%
9. Projected payroll	6,757,931	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$308,925	\$321,282
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,252,818	1,343,596
3. Payment on 2002 ERI, adjusted for timing	189,931	189,931
4. Payment on 2003 ERI, adjusted for timing	19,415	19,415
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$1,771,089	\$1,874,224
7. Total Appropriation, payable on July 1	1,737,842	1,839,040

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.



### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Holliston

1600

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 8 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	102
2. Participants active during the year ended December 31, 2013	248
3. Inactive participants entitled to a return of their employee contributions	137
4. Inactive participants with a vested right to a deferred or immediate benefit	14

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$1,185,608
2. Administrative expenses		77,324
3. Expected employee contributions		<u>-915,173</u>
4. Employer normal cost: (1) + (2) + (3)		\$347,759
5. Actuarial accrued liability		45,045,538
Retired participants and beneficiaries	\$17,398,823	
Active participants	26,331,727	
Inactive participants	1,314,988	
6. Actuarial value of assets		22,740,285
7. Unfunded actuarial accrued liability: (5) - (6)		\$22,305,253

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$361,431	3.62%
2. Projected unfunded actuarial accrued liability	23,166,880	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,508,017	
4. Payment on 2002 ERI, adjusted for timing	56,525	
5. Payment on 2003 ERI, adjusted for timing	20,957	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$1,946,930	19.48%
8. Total FY15 Appropriation, payable on July 1	1,909,829	19.11%
9. Projected payroll	9,992,766	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$375,888	\$390,924
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,443,760	1,548,374
3. Payment on 2002 ERI, adjusted for timing	56,525	56,525
4. Payment on 2003 ERI, adjusted for timing	20,957	20,957
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$1,897,130	\$2,016,780
7. Total Appropriation, payable on July 1	1,861,516	1,978,920

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Hopkinton

1700

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 7 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	69
2. Participants active during the year ended December 31, 2013	256
3. Inactive participants entitled to a return of their employee contributions	133
4. Inactive participants with a vested right to a deferred or immediate benefit	28

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$1,553,433
2. Administrative expenses		101,313
3. Expected employee contributions		<u>-1,142,223</u>
4. Employer normal cost: (1) + (2) + (3)		\$512,523
5. Actuarial accrued liability		46,189,043
Retired participants and beneficiaries	\$14,929,402	
Active participants	29,665,423	
Inactive participants	1,594,218	
6. Actuarial value of assets		27,754,548
7. Unfunded actuarial accrued liability: (5) - (6)		\$18,434,495

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$532,672	4.34%
2. Projected unfunded actuarial accrued liability	19,146,599	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,314,592	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$1,847,264	15.04%
8. Total FY15 Appropriation, payable on July 1	1,812,062	14.75%
9. Projected payroll	12,283,187	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$553,979	\$576,138
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,207,838	1,295,358
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$1,761,817	\$1,871,496
7. Total Appropriation, payable on July 1	1,728,744	1,836,364

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Hudson

1800

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 23 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	186
2. Participants active during the year ended December 31, 2013	457
3. Inactive participants entitled to a return of their employee contributions	132
4. Inactive participants with a vested right to a deferred or immediate benefit	11

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$2,581,676
2. Administrative expenses		168,373
3. Expected employee contributions		<u>-1,893,271</u>
4. Employer normal cost: (1) + (2) + (3)		\$856,778
5. Actuarial accrued liability		96,192,276
Retired participants and beneficiaries	\$43,313,978	
Active participants	51,586,576	
Inactive participants	1,291,722	
6. Actuarial value of assets		42,426,766
7. Unfunded actuarial accrued liability: (5) - (6)		\$53,765,510

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$890,462	4.32%
2. Projected unfunded actuarial accrued liability	55,842,413	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	3,343,689	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$4,234,151	20.55%
8. Total FY15 Appropriation, payable on July 1	4,153,464	20.16%
9. Projected payroll	20,602,320	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$926,080	\$963,123
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	3,555,295	3,812,910
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$4,481,375	\$4,776,033
7. Total Appropriation, payable on July 1	4,397,249	4,686,376

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Lincoln

1900

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 8 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	90
2. Participants active during the year ended December 31, 2013	197
3. Inactive participants entitled to a return of their employee contributions	127
4. Inactive participants with a vested right to a deferred or immediate benefit	9

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$1,130,900
2. Administrative expenses		73,756
3. Expected employee contributions		<u>-873,215</u>
4. Employer normal cost: (1) + (2) + (3)		\$331,441
5. Actuarial accrued liability		42,270,461
Retired participants and beneficiaries	\$17,877,228	
Active participants	23,214,025	
Inactive participants	1,179,208	
6. Actuarial value of assets		19,979,125
7. Unfunded actuarial accrued liability: (5) - (6)		\$22,291,336

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$344,471	3.66%
2. Projected unfunded actuarial accrued liability	23,152,426	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,309,236	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$1,653,707	17.58%
8. Total FY15 Appropriation, payable on July 1	1,622,193	17.24%
9. Projected payroll	9,408,678	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$358,250	\$372,580
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,479,151	1,586,329
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$1,837,401	\$1,958,909
7. Total Appropriation, payable on July 1	1,802,909	1,922,136

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

##### Summary of Actuarial Valuation Results for Town of Littleton

2000

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 11 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	85
2. Participants active during the year ended December 31, 2013	243
3. Inactive participants entitled to a return of their employee contributions	63
4. Inactive participants with a vested right to a deferred or immediate benefit	15

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$1,324,179
2. Administrative expenses		86,361
3. Expected employee contributions		<u>-982,342</u>
4. Employer normal cost: (1) + (2) + (3)		\$428,198
5. Actuarial accrued liability		45,237,818
Retired participants and beneficiaries	\$17,794,434	
Active participants	25,900,395	
Inactive participants	1,542,989	
6. Actuarial value of assets		25,033,064
7. Unfunded actuarial accrued liability: (5) - (6)		\$20,204,754

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$445,032	4.21%
2. Projected unfunded actuarial accrued liability	20,985,242	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,299,625	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$1,744,657	16.50%
8. Total FY15 Appropriation, payable on July 1	1,711,410	16.19%
9. Projected payroll	10,573,208	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$462,833	\$481,346
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,333,199	1,429,802
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$1,796,032	\$1,911,148
7. Total Appropriation, payable on July 1	1,762,316	1,875,271

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of North Reading

2100

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 22 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	155
2. Participants active during the year ended December 31, 2013	256
3. Inactive participants entitled to a return of their employee contributions	32
4. Inactive participants with a vested right to a deferred or immediate benefit	7

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$1,517,707
2. Administrative expenses		98,983
3. Expected employee contributions		<u>-1,134,541</u>
4. Employer normal cost: (1) + (2) + (3)		\$482,149
5. Actuarial accrued liability		70,512,431
Retired participants and beneficiaries	\$34,506,063	
Active participants	35,330,631	
Inactive participants	675,737	
6. Actuarial value of assets		28,599,080
7. Unfunded actuarial accrued liability: (5) - (6)		\$41,913,351

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$501,104	4.06%
2. Projected unfunded actuarial accrued liability	43,532,418	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	2,607,203	
4. Payment on 2002 ERI, adjusted for timing	21,641	
5. Payment on 2003 ERI, adjusted for timing	56,991	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$3,186,939	25.82%
8. Total FY15 Appropriation, payable on July 1	3,126,208	25.33%
9. Projected payroll	12,341,283	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$521,148	\$541,994
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	2,746,378	2,945,379
3. Payment on 2002 ERI, adjusted for timing	21,641	21,641
4. Payment on 2003 ERI, adjusted for timing	56,991	56,991
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$3,346,158	\$3,566,005
7. Total Appropriation, payable on July 1	3,283,343	3,499,063

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Pepperell

2200

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 6 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	46
2. Participants active during the year ended December 31, 2013	82
3. Inactive participants entitled to a return of their employee contributions	6
4. Inactive participants with a vested right to a deferred or immediate benefit	6

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$588,383	
2. Administrative expenses		38,373	
3. Expected employee contributions		<u>-410,604</u>	
4. Employer normal cost: (1) + (2) + (3)		\$216,152	
5. Actuarial accrued liability			23,444,801
Retired participants and beneficiaries	\$11,113,975		
Active participants	11,863,484		
Inactive participants	467,342		
6. Actuarial value of assets			11,411,622
7. Unfunded actuarial accrued liability: (5) - (6)			\$12,033,179

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$224,650	5.14%
2. Projected unfunded actuarial accrued liability	12,498,008	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	761,752	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$986,402	22.56%
8. Total FY15 Appropriation, payable on July 1	967,605	22.13%
9. Projected payroll	4,372,392	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$233,636	\$242,981
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	794,816	852,407
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$1,028,452	\$1,095,388
7. Total Appropriation, payable on July 1	1,009,146	1,074,825

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Sherborn

2300

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 2 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	37
2. Participants active during the year ended December 31, 2013	79
3. Inactive participants entitled to a return of their employee contributions	25
4. Inactive participants with a vested right to a deferred or immediate benefit	5

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$504,217	
2. Administrative expenses		32,884	
3. Expected employee contributions		<u>-356,193</u>	
4. Employer normal cost: (1) + (2) + (3)		\$180,908	
5. Actuarial accrued liability			17,858,129
Retired participants and beneficiaries	\$8,349,370		
Active participants	9,060,195		
Inactive participants	448,564		
6. Actuarial value of assets			8,229,332
7. Unfunded actuarial accrued liability: (5) - (6)			\$9,628,797

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$188,020	4.87%
2. Projected unfunded actuarial accrued liability	10,000,747	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	526,202	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$714,222	18.50%
8. Total FY15 Appropriation, payable on July 1	700,612	18.15%
9. Projected payroll	3,860,455	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$195,541	\$203,363
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	641,533	688,018
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$837,074	\$891,381
7. Total Appropriation, payable on July 1	821,360	874,648

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.



### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Shirley

2400

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 5 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	36
2. Participants active during the year ended December 31, 2013	41
3. Inactive participants entitled to a return of their employee contributions	43
4. Inactive participants with a vested right to a deferred or immediate benefit	5

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$265,076	
2. Administrative expenses		17,288	
3. Expected employee contributions		-181,884	
4. Employer normal cost: (1) + (2) + (3)		\$100,480	
5. Actuarial accrued liability			15,250,612
Retired participants and beneficiaries	\$8,653,735		
Active participants	5,856,443		
Inactive participants	740,434		
6. Actuarial value of assets			6,534,340
7. Unfunded actuarial accrued liability: (5) - (6)			\$8,716,272

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$104,430	5.28%
2. Projected unfunded actuarial accrued liability	9,052,972	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	505,357	
4. Payment on 2002 ERI, adjusted for timing	32,907	
5. Payment on 2003 ERI, adjusted for timing	19,732	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$662,426	33.48%
8. Total FY15 Appropriation, payable on July 1	649,803	32.85%
9. Projected payroll	1,978,379	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$108,607	\$112,951
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	562,814	603,595
3. Payment on 2002 ERI, adjusted for timing	32,907	32,907
4. Payment on 2003 ERI, adjusted for timing	19,732	19,732
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$724,060	\$769,185
7. Total Appropriation, payable on July 1	710,468	754,746

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Stow

2500

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 6 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	35
2. Participants active during the year ended December 31, 2013	56
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	2

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$396,148	
2. Administrative expenses		25,836	
3. Expected employee contributions		<u>-293,446</u>	
4. Employer normal cost: (1) + (2) + (3)		\$128,538	
5. Actuarial accrued liability			16,048,724
Retired participants and beneficiaries	\$6,915,842		
Active participants	8,950,001		
Inactive participants	182,881		
6. Actuarial value of assets			7,306,097
7. Unfunded actuarial accrued liability: (5) - (6)			\$8,742,627

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$133,591	4.26%
2. Projected unfunded actuarial accrued liability	9,080,345	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	565,661	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$699,252	22.29%
8. Total FY15 Appropriation, payable on July 1	685,927	21.87%
9. Projected payroll	3,136,374	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$138,935	\$144,492
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	576,657	618,442
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$715,592	\$762,934
7. Total Appropriation, payable on July 1	702,159	748,612

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Sudbury

2600

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 15 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	180
2. Participants active during the year ended December 31, 2013	278
3. Inactive participants entitled to a return of their employee contributions	102
4. Inactive participants with a vested right to a deferred or immediate benefit	17

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$1,704,150
2. Administrative expenses		111,142
3. Expected employee contributions		<u>-1,343,489</u>
4. Employer normal cost: (1) + (2) + (3)		\$471,803
5. Actuarial accrued liability		82,852,523
Retired participants and beneficiaries	\$42,191,552	
Active participants	38,530,980	
Inactive participants	2,129,991	
6. Actuarial value of assets		33,703,684
7. Unfunded actuarial accrued liability: (5) - (6)		\$49,148,839

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$490,352	3.36%
2. Projected unfunded actuarial accrued liability	51,047,405	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	3,008,724	
4. Payment on 2002 ERI, adjusted for timing	26,286	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$3,525,362	24.18%
8. Total FY15 Appropriation, payable on July 1	3,458,181	23.72%
9. Projected payroll	14,577,173	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$509,966	\$530,365
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	3,245,650	3,480,828
3. Payment on 2002 ERI, adjusted for timing	26,286	26,286
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$3,781,902	\$4,037,479
7. Total Appropriation, payable on July 1	3,710,907	3,961,686

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Tewksbury

2700

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 30 beneficiaries in pay status, 1 retired participant in suspended status and no beneficiaries in suspended status)	287
2. Participants active during the year ended December 31, 2013	387
3. Inactive participants entitled to a return of their employee contributions	77
4. Inactive participants with a vested right to a deferred or immediate benefit	14

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$2,468,017
2. Administrative expenses		160,961
3. Expected employee contributions		<u>-1,798,764</u>
4. Employer normal cost: (1) + (2) + (3)		\$830,214
5. Actuarial accrued liability		129,838,442
Retired participants and beneficiaries	\$77,298,029	
Active participants	51,249,693	
Inactive participants	1,290,720	
6. Actuarial value of assets		48,008,379
7. Unfunded actuarial accrued liability: (5) - (6)		\$81,830,063

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$862,853	4.47%
2. Projected unfunded actuarial accrued liability	84,991,069	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	4,984,708	
4. Payment on 2002 ERI, adjusted for timing	228,668	
5. Payment on 2003 ERI, adjusted for timing	350,246	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$6,426,475	33.27%
8. Total FY15 Appropriation, payable on July 1	6,304,010	32.64%
9. Projected payroll	19,313,750	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$897,367	\$933,262
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	5,236,061	5,615,464
3. Payment on 2002 ERI, adjusted for timing	228,668	228,668
4. Payment on 2003 ERI, adjusted for timing	350,246	350,246
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$6,712,342	\$7,127,640
7. Total Appropriation, payable on July 1	6,586,336	6,993,838

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Townsend

2800

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 2 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	21
2. Participants active during the year ended December 31, 2013	63
3. Inactive participants entitled to a return of their employee contributions	8
4. Inactive participants with a vested right to a deferred or immediate benefit	4

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$406,720	
2. Administrative expenses		26,526	
3. Expected employee contributions		<u>-267,658</u>	
4. Employer normal cost: (1) + (2) + (3)		\$165,588	
5. Actuarial accrued liability			14,891,382
Retired participants and beneficiaries	\$5,485,815		
Active participants	9,035,324		
Inactive participants	370,243		
6. Actuarial value of assets			7,746,676
7. Unfunded actuarial accrued liability: (5) - (6)			\$7,144,706

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$172,098	5.85%
2. Projected unfunded actuarial accrued liability	7,420,698	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	494,555	
4. Payment on 2002 ERI, adjusted for timing	20,159	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$686,812	23.36%
8. Total FY15 Appropriation, payable on July 1	673,724	22.91%
9. Projected payroll	2,940,505	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$178,982	\$186,141
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	463,335	496,908
3. Payment on 2002 ERI, adjusted for timing	20,159	20,159
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$662,476	\$703,208
7. Total Appropriation, payable on July 1	650,040	690,007

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Tyngsborough

2900

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 11 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	64
2. Participants active during the year ended December 31, 2013	173
3. Inactive participants entitled to a return of their employee contributions	56
4. Inactive participants with a vested right to a deferred or immediate benefit	6

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$936,982
2. Administrative expenses		61,109
3. Expected employee contributions		<u>-675,177</u>
4. Employer normal cost: (1) + (2) + (3)		\$322,914
5. Actuarial accrued liability		32,986,252
Retired participants and beneficiaries	\$15,084,686	
Active participants	17,495,376	
Inactive participants	406,190	
6. Actuarial value of assets		16,077,295
7. Unfunded actuarial accrued liability: (5) - (6)		\$16,908,957

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$335,609	4.60%
2. Projected unfunded actuarial accrued liability	17,562,131	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,090,934	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$1,426,543	19.55%
8. Total FY15 Appropriation, payable on July 1	1,399,358	19.18%
9. Projected payroll	7,295,805	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$349,033	\$362,994
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,115,508	1,196,337
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$1,464,541	\$1,559,331
7. Total Appropriation, payable on July 1	1,437,048	1,530,059

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Wayland

3000

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 17 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	219
2. Participants active during the year ended December 31, 2013	393
3. Inactive participants entitled to a return of their employee contributions	137
4. Inactive participants with a vested right to a deferred or immediate benefit	17

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$2,163,711
2. Administrative expenses		141,114
3. Expected employee contributions		<u>-1,643,714</u>
4. Employer normal cost: (1) + (2) + (3)		\$661,111
5. Actuarial accrued liability		88,637,426
Retired participants and beneficiaries	\$45,166,551	
Active participants	41,899,792	
Inactive participants	1,571,083	
6. Actuarial value of assets		38,474,559
7. Unfunded actuarial accrued liability: (5) - (6)		\$50,162,867

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$687,102	3.87%
2. Projected unfunded actuarial accrued liability	52,100,604	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	3,103,215	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	22,815	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$3,813,132	21.49%
8. Total FY15 Appropriation, payable on July 1	3,740,468	21.08%
9. Projected payroll	17,745,482	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$714,586	\$743,169
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	3,310,577	3,550,460
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	22,815	22,815
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$4,047,978	\$4,316,444
7. Total Appropriation, payable on July 1	3,971,988	4,235,414

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Westford

3100

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 15 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	179
2. Participants active during the year ended December 31, 2013	542
3. Inactive participants entitled to a return of their employee contributions	170
4. Inactive participants with a vested right to a deferred or immediate benefit	20

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$2,791,927
2. Administrative expenses		182,085
3. Expected employee contributions		<u>-2,074,782</u>
4. Employer normal cost: (1) + (2) + (3)		\$899,230
5. Actuarial accrued liability		90,856,576
Retired participants and beneficiaries	\$36,458,867	
Active participants	52,853,047	
Inactive participants	1,544,662	
6. Actuarial value of assets		45,928,945
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$44,927,631</u>

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$934,583	4.21%
2. Projected unfunded actuarial accrued liability	46,663,136	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	2,760,480	
4. Payment on 2002 ERI, adjusted for timing	101,587	
5. Payment on 2003 ERI, adjusted for timing	25,361	
6. Payment on 2010 ERI, adjusted for timing	<u>60,947</u>	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$3,882,958	17.47%
8. Total FY15 Appropriation, payable on July 1	3,808,963	17.14%
9. Projected payroll	22,223,033	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$971,966	\$1,010,845
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	2,910,352	3,121,235
3. Payment on 2002 ERI, adjusted for timing	101,587	101,587
4. Payment on 2003 ERI, adjusted for timing	25,361	25,361
5. Payment on 2010 ERI, adjusted for timing	<u>60,947</u>	<u>60,947</u>
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$4,070,213	\$4,319,975
7. Total Appropriation, payable on July 1	3,993,806	4,238,879

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.



### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Weston

3200

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 24 beneficiaries in pay status, 1 retired participant in suspended status and no beneficiaries in suspended status)	227
2. Participants active during the year ended December 31, 2013	377
3. Inactive participants entitled to a return of their employee contributions	188
4. Inactive participants with a vested right to a deferred or immediate benefit	18

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$2,249,189
2. Administrative expenses		146,689
3. Expected employee contributions		<u>-1,763,356</u>
4. Employer normal cost: (1) + (2) + (3)		\$632,522
5. Actuarial accrued liability		92,382,444
Retired participants and beneficiaries	\$44,923,814	
Active participants	45,087,894	
Inactive participants	2,370,736	
6. Actuarial value of assets		36,802,655
7. Unfunded actuarial accrued liability: (5) - (6)		\$55,579,789

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$657,389	3.46%
2. Projected unfunded actuarial accrued liability	57,726,775	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	3,562,175	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$4,219,564	22.22%
8. Total FY15 Appropriation, payable on July 1	4,139,155	21.80%
9. Projected payroll	18,990,643	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$683,685	\$711,032
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	3,668,253	3,934,053
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$4,351,938	\$4,645,085
7. Total Appropriation, payable on July 1	4,270,242	4,557,886

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Town of Wilmington

3300

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 37 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	229
2. Participants active during the year ended December 31, 2013	405
3. Inactive participants entitled to a return of their employee contributions	94
4. Inactive participants with a vested right to a deferred or immediate benefit	16

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$2,481,116
2. Administrative expenses		161,815
3. Expected employee contributions		<u>-1,912,226</u>
4. Employer normal cost: (1) + (2) + (3)		\$730,705
5. Actuarial accrued liability		116,317,220
Retired participants and beneficiaries	\$55,778,179	
Active participants	59,442,472	
Inactive participants	1,096,569	
6. Actuarial value of assets		46,009,616
7. Unfunded actuarial accrued liability: (5) - (6)		\$70,307,604

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$759,432	3.67%
2. Projected unfunded actuarial accrued liability	73,023,510	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	4,289,726	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$5,049,158	24.40%
8. Total FY15 Appropriation, payable on July 1	4,952,939	23.94%
9. Projected payroll	20,693,033	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$789,809	\$821,401
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	4,654,647	4,991,920
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$5,444,456	\$5,813,321
7. Total Appropriation, payable on July 1	5,342,251	5,704,192

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Acton-Boxborough RSD

3400

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 5 beneficiaries in pay status)	85
2. Participants active during the year ended December 31, 2013	409
3. Inactive participants entitled to a return of their employee contributions	40
4. Inactive participants with a vested right to a deferred or immediate benefit	7

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$1,543,864
2. Administrative expenses		100,689
3. Expected employee contributions		<u>-1,136,669</u>
4. Employer normal cost: (1) + (2) + (3)		\$507,884
5. Actuarial accrued liability		38,544,752
Retired participants and beneficiaries	\$13,435,287	
Active participants	24,638,883	
Inactive participants	470,582	
6. Actuarial value of assets		16,712,747
7. Unfunded actuarial accrued liability: (5) - (6)		\$21,832,005

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	\$527,851	4.17%
2. Projected unfunded actuarial accrued liability	22,675,351	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,262,475	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$1,790,326	14.16%
8. Total FY15 Appropriation, payable on July 1	1,756,209	13.89%
9. Projected payroll	12,647,312	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing	\$548,965	\$570,924
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,449,984	1,555,050
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$1,998,949	\$2,125,974
7. Total Appropriation, payable on July 1	1,961,424	2,086,065

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Acton Water Supply

3500

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	8
2. Participants active during the year ended December 31, 2013	15
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	1

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$81,433
2. Administrative expenses		5,311
3. Expected employee contributions		<u>-95,881</u>
4. Employer normal cost: (1) + (2) + (3)		<u>-\$9,137</u>
5. Actuarial accrued liability		5,100,805
Retired participants and beneficiaries	\$2,788,668	
Active participants	2,195,982	
Inactive participants	116,155	
6. Actuarial value of assets		2,475,704
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$2,625,101</u>

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	-\$9,496	-0.96%
2. Projected unfunded actuarial accrued liability	2,726,506	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	139,910	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	5,544	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$135,958	13.68%
8. Total FY15 Appropriation, payable on July 1	133,367	13.42%
9. Projected payroll	994,059	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	-\$9,876	-\$10,271
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	173,295	185,852
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	5,544	5,544
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$168,963	\$181,125
7. Total Appropriation, payable on July 1	165,791	177,725

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Bedford Housing Authority

3600

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 1 beneficiary in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	2
2. Participants active during the year ended December 31, 2013	3
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$16,441
2. Administrative expenses		1,072
3. Expected employee contributions		<u>-12,550</u>
4. Employer normal cost: (1) + (2) + (3)		\$4,963
5. Actuarial accrued liability		483,583
Retired participants and beneficiaries	\$225,105	
Active participants	258,478	
Inactive participants	0	
6. Actuarial value of assets		229,705
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$253,878</u>

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	\$5,158	3.90%
2. Projected unfunded actuarial accrued liability	263,685	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	12,053	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	6,942	
6. Payment on 2010 ERI, adjusted for timing	<u>0</u>	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$24,153	18.28%
8. Total FY15 Appropriation, payable on July 1	23,693	17.93%
9. Projected payroll	132,123	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing	\$5,364	\$5,579
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	14,729	15,797
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	6,942	6,942
5. Payment on 2010 ERI, adjusted for timing	<u>0</u>	<u>0</u>
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$27,035	\$28,318
7. Total Appropriation, payable on July 1	26,527	27,786

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Billerica Housing Authority

3700

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 1 beneficiary in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	3
2. Participants active during the year ended December 31, 2013	6
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$35,161
2. Administrative expenses		2,293
3. Expected employee contributions		<u>-28,302</u>
4. Employer normal cost: (1) + (2) + (3)		\$9,152
5. Actuarial accrued liability		1,625,805
Retired participants and beneficiaries	\$777,580	
Active participants	848,225	
Inactive participants	0	
6. Actuarial value of assets		597,161
7. Unfunded actuarial accrued liability: (5) - (6)		\$1,028,644

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$9,512	3.14%
2. Projected unfunded actuarial accrued liability	1,068,379	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	68,697	
4. Payment on 2002 ERI, adjusted for timing	9,784	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$87,993	29.06%
8. Total FY15 Appropriation, payable on July 1	86,316	28.50%
9. Projected payroll	302,838	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$9,892	\$10,288
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	64,900	69,603
3. Payment on 2002 ERI, adjusted for timing	9,784	9,784
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$84,576	\$89,675
7. Total Appropriation, payable on July 1	82,988	87,992

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Chelmsford Housing Authority

3800

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 1 beneficiary in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	3
2. Participants active during the year ended December 31, 2013	21
3. Inactive participants entitled to a return of their employee contributions	5
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$141,700
2. Administrative expenses		9,241
3. Expected employee contributions		<u>-130,071</u>
4. Employer normal cost: (1) + (2) + (3)		\$20,870
5. Actuarial accrued liability		2,566,049
Retired participants and beneficiaries	\$565,355	
Active participants	1,972,870	
Inactive participants	27,824	
6. Actuarial value of assets		1,496,372
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$1,069,677</u>

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$21,690	1.62%
2. Projected unfunded actuarial accrued liability	1,110,997	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	60,072	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$81,762	6.09%
8. Total FY15 Appropriation, payable on July 1	80,204	5.97%
9. Projected payroll	1,342,869	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$22,558	\$23,460
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	71,162	76,318
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$93,720	\$99,778
7. Total Appropriation, payable on July 1	91,961	97,905

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Chelmsford Water District

3900

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 2 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	12
2. Participants active during the year ended December 31, 2013	20
3. Inactive participants entitled to a return of their employee contributions	1
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$110,629
2. Administrative expenses		7,215
3. Expected employee contributions		<u>-111,685</u>
4. Employer normal cost: (1) + (2) + (3)		\$6,159
5. Actuarial accrued liability		5,990,322
Retired participants and beneficiaries	\$2,932,096	
Active participants	3,056,990	
Inactive participants	1,236	
6. Actuarial value of assets		3,157,950
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$2,832,372</u>

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$6,401	0.53%
2. Projected unfunded actuarial accrued liability	2,941,783	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	241,571	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$247,972	20.69%
8. Total FY15 Appropriation, payable on July 1	243,247	20.29%
9. Projected payroll	1,198,788	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$6,657	\$6,923
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	182,951	196,207
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$189,608	\$203,130
7. Total Appropriation, payable on July 1	186,049	199,317

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.



### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Dracut Housing Authority

4000

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	4
2. Participants active during the year ended December 31, 2013	6
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$31,091
2. Administrative expenses		2,028
3. Expected employee contributions		<u>-32,494</u>
4. Employer normal cost: (1) + (2) + (3)		\$625
5. Actuarial accrued liability		2,308,985
Retired participants and beneficiaries	\$1,021,233	
Active participants	1,287,752	
Inactive participants	0	
6. Actuarial value of assets		624,776
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$1,684,209</u>

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	\$650	0.18%
2. Projected unfunded actuarial accrued liability	1,749,268	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	100,744	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$101,394	28.38%
8. Total FY15 Appropriation, payable on July 1	99,462	27.84%
9. Projected payroll	357,257	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing	\$676	\$703
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	111,635	119,724
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$112,311	\$120,427
7. Total Appropriation, payable on July 1	110,203	118,166

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Dracut Water Supply

4100

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 2 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	5
2. Participants active during the year ended December 31, 2013	16
3. Inactive participants entitled to a return of their employee contributions	3
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$52,679
2. Administrative expenses		3,436
3. Expected employee contributions		<u>-57,721</u>
4. Employer normal cost: (1) + (2) + (3)		<u>-\$1,606</u>
5. Actuarial accrued liability		3,631,875
Retired participants and beneficiaries	\$1,668,434	
Active participants	1,954,890	
Inactive participants	8,551	
6. Actuarial value of assets		1,340,230
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$2,291,645</u>

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	-\$1,669	-0.27%
2. Projected unfunded actuarial accrued liability	2,380,169	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	133,093	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$131,424	21.23%
8. Total FY15 Appropriation, payable on July 1	128,920	20.83%
9. Projected payroll	619,004	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	-\$1,736	-\$1,805
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	152,163	163,188
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$150,427	\$161,383
7. Total Appropriation, payable on July 1	147,603	158,353

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for E. Chelmsford Water

4200

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 2 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	3
2. Participants active during the year ended December 31, 2013	3
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$22,953
2. Administrative expenses		1,497
3. Expected employee contributions		<u>-17,636</u>
4. Employer normal cost: (1) + (2) + (3)		\$6,814
5. Actuarial accrued liability		627,146
Retired participants and beneficiaries	\$252,916	
Active participants	374,230	
Inactive participants	0	
6. Actuarial value of assets		363,521
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$263,625</u>

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	\$7,082	3.78%
2. Projected unfunded actuarial accrued liability	273,809	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	12,152	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	<u>0</u>	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$19,234	10.27%
8. Total FY15 Appropriation, payable on July 1	18,867	10.07%
9. Projected payroll	187,355	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing	\$7,365	\$7,660
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	17,714	18,998
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	<u>0</u>	<u>0</u>
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$25,079	\$26,658
7. Total Appropriation, payable on July 1	24,608	26,158

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

##### Summary of Actuarial Valuation Results for E. Middlesex Mosq Control

4300

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	0
2. Participants active during the year ended December 31, 2013	6
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$35,040
2. Administrative expenses		2,285
3. Expected employee contributions		<u>-30,255</u>
4. Employer normal cost: (1) + (2) + (3)		\$7,070
5. Actuarial accrued liability		1,374,668
Retired participants and beneficiaries	\$0	
Active participants	1,374,668	
Inactive participants	0	
6. Actuarial value of assets		914,414
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$460,254</u>

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	\$7,348	2.04%
2. Projected unfunded actuarial accrued liability	478,033	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	32,592	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$39,940	11.08%
8. Total FY15 Appropriation, payable on July 1	39,179	10.87%
9. Projected payroll	360,373	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing	\$7,642	\$7,948
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	30,171	32,358
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$37,813	\$40,306
7. Total Appropriation, payable on July 1	37,103	39,549

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

##### Summary of Actuarial Valuation Results for Greater Lowell RVTSD

4400

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 8 beneficiaries in pay status, 1 retired participant in suspended status and no beneficiaries in suspended status)	74
2. Participants active during the year ended December 31, 2013	102
3. Inactive participants entitled to a return of their employee contributions	14
4. Inactive participants with a vested right to a deferred or immediate benefit	1

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$510,931
2. Administrative expenses		33,322
3. Expected employee contributions		<u>-458,660</u>
4. Employer normal cost: (1) + (2) + (3)		\$85,593
5. Actuarial accrued liability		23,370,798
Retired participants and beneficiaries	\$11,268,265	
Active participants	11,932,887	
Inactive participants	169,646	
6. Actuarial value of assets		9,204,984
7. Unfunded actuarial accrued liability: (5) - (6)		\$14,165,814

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$88,958	1.78%
2. Projected unfunded actuarial accrued liability	14,713,024	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	834,615	
4. Payment on 2002 ERI, adjusted for timing	165,127	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$1,088,700	21.74%
8. Total FY15 Appropriation, payable on July 1	1,067,953	21.32%
9. Projected payroll	5,008,124	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$92,516	\$96,217
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	892,444	957,110
3. Payment on 2002 ERI, adjusted for timing	165,127	165,127
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$1,150,087	\$1,218,454
7. Total Appropriation, payable on July 1	1,128,497	1,195,581

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Groton-Dunstable RSD

4500

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 3 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	54
2. Participants active during the year ended December 31, 2013	146
3. Inactive participants entitled to a return of their employee contributions	74
4. Inactive participants with a vested right to a deferred or immediate benefit	7

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$541,249	
2. Administrative expenses		35,299	
3. Expected employee contributions		<u>-414,784</u>	
4. Employer normal cost: (1) + (2) + (3)		\$161,764	
5. Actuarial accrued liability			18,231,609
Retired participants and beneficiaries	\$7,121,328		
Active participants	10,129,661		
Inactive participants	980,620		
6. Actuarial value of assets			10,155,349
7. Unfunded actuarial accrued liability: (5) - (6)			\$8,076,260

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$168,124	3.66%
2. Projected unfunded actuarial accrued liability	8,388,237	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	509,937	
4. Payment on 2002 ERI, adjusted for timing	4,052	
5. Payment on 2003 ERI, adjusted for timing	15,357	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$697,470	15.18%
8. Total FY15 Appropriation, payable on July 1	684,179	14.89%
9. Projected payroll	4,595,737	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$174,849	\$181,843
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	527,277	565,483
3. Payment on 2002 ERI, adjusted for timing	4,052	4,052
4. Payment on 2003 ERI, adjusted for timing	15,357	15,357
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$721,535	\$766,735
7. Total Appropriation, payable on July 1	707,990	752,342

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Hudson Housing Authority

4600

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 1 beneficiary in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	6
2. Participants active during the year ended December 31, 2013	5
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	1

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$27,613
2. Administrative expenses		1,801
3. Expected employee contributions		<u>-26,206</u>
4. Employer normal cost: (1) + (2) + (3)		\$3,208
5. Actuarial accrued liability		2,032,825
Retired participants and beneficiaries	\$1,412,817	
Active participants	599,440	
Inactive participants	20,568	
6. Actuarial value of assets		721,153
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$1,311,672</u>

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	\$3,334	1.20%
2. Projected unfunded actuarial accrued liability	1,362,340	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	63,654	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	<u>0</u>	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$66,988	24.12%
8. Total FY15 Appropriation, payable on July 1	65,711	23.66%
9. Projected payroll	277,783	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing	\$3,467	\$3,606
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	87,925	94,296
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	<u>0</u>	<u>0</u>
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$91,392	\$97,902
7. Total Appropriation, payable on July 1	89,676	96,064

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Lincoln Sudbury

4700

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 2 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	42
2. Participants active during the year ended December 31, 2013	61
3. Inactive participants entitled to a return of their employee contributions	35
4. Inactive participants with a vested right to a deferred or immediate benefit	2

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$299,725
2. Administrative expenses		19,548
3. Expected employee contributions		-258,987
4. Employer normal cost: (1) + (2) + (3)		\$60,286
5. Actuarial accrued liability		12,311,221
Retired participants and beneficiaries	\$6,143,479	
Active participants	5,769,080	
Inactive participants	398,662	
6. Actuarial value of assets		4,836,704
7. Unfunded actuarial accrued liability: (5) - (6)		\$7,474,517

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$62,656	2.26%
2. Projected unfunded actuarial accrued liability	7,763,249	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	470,774	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$533,430	19.22%
8. Total FY15 Appropriation, payable on July 1	523,265	18.86%
9. Projected payroll	2,775,023	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$65,162	\$67,768
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	493,866	529,651
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$559,028	\$597,419
7. Total Appropriation, payable on July 1	548,534	586,204

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.



### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Nashoba Vally THSD

4900

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 2 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	22
2. Participants active during the year ended December 31, 2013	20
3. Inactive participants entitled to a return of their employee contributions	8
4. Inactive participants with a vested right to a deferred or immediate benefit	1

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$98,417	
2. Administrative expenses		6,419	
3. Expected employee contributions		<u>-75,117</u>	
4. Employer normal cost: (1) + (2) + (3)		\$29,719	
5. Actuarial accrued liability			4,071,602
Retired participants and beneficiaries	\$2,914,871		
Active participants	1,074,216		
Inactive participants	82,515		
6. Actuarial value of assets			1,084,055
7. Unfunded actuarial accrued liability: (5) - (6)			\$2,987,547

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$30,887	3.86%
2. Projected unfunded actuarial accrued liability	3,102,953	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	151,417	
4. Payment on 2002 ERI, adjusted for timing	4,842	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$187,146	23.38%
8. Total FY15 Appropriation, payable on July 1	183,580	22.94%
9. Projected payroll	800,379	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$32,122	\$33,407
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	198,447	212,827
3. Payment on 2002 ERI, adjusted for timing	4,842	4,842
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$235,411	\$251,076
7. Total Appropriation, payable on July 1	230,992	246,363

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for N. Chelmsford Water

5000

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 1 beneficiary in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	1
2. Participants active during the year ended December 31, 2013	7
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$35,820
2. Administrative expenses		2,336
3. Expected employee contributions		<u>-43,639</u>
4. Employer normal cost: (1) + (2) + (3)		<u>-\$5,483</u>
5. Actuarial accrued liability		1,921,107
Retired participants and beneficiaries	\$61,477	
Active participants	1,859,630	
Inactive participants	0	
6. Actuarial value of assets		1,227,792
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$693,315</u>

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	-\$5,699	- 1.16%
2. Projected unfunded actuarial accrued liability	720,097	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	44,094	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$38,395	7.80%
8. Total FY15 Appropriation, payable on July 1	37,663	7.65%
9. Projected payroll	492,483	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	-\$5,927	-\$6,164
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	45,781	49,099
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$39,854	\$42,935
7. Total Appropriation, payable on July 1	39,106	42,129

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for North Middlesex RSD

5100

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 7 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	81
2. Participants active during the year ended December 31, 2013	166
3. Inactive participants entitled to a return of their employee contributions	58
4. Inactive participants with a vested right to a deferred or immediate benefit	9

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$543,866	
2. Administrative expenses		35,470	
3. Expected employee contributions		<u>-441,654</u>	
4. Employer normal cost: (1) + (2) + (3)		\$137,682	
5. Actuarial accrued liability			19,165,233
Retired participants and beneficiaries	\$8,167,280		
Active participants	10,244,450		
Inactive participants	753,503		
6. Actuarial value of assets			8,811,594
7. Unfunded actuarial accrued liability: (5) - (6)			\$10,353,639

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$143,095	2.92%
2. Projected unfunded actuarial accrued liability	10,753,589	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	608,202	
4. Payment on 2002 ERI, adjusted for timing	23,123	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$774,420	15.83%
8. Total FY15 Appropriation, payable on July 1	759,662	15.52%
9. Projected payroll	4,893,231	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$148,819	\$154,772
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	680,381	729,681
3. Payment on 2002 ERI, adjusted for timing	23,123	23,123
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$852,323	\$907,576
7. Total Appropriation, payable on July 1	836,323	890,539

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for North Middlesex Welfare District

5200

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	1
2. Participants active during the year ended December 31, 2013	0
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$0
2. Administrative expenses		0
3. Expected employee contributions		<u>-0</u>
4. Employer normal cost: (1) + (2) + (3)		\$0
5. Actuarial accrued liability		16,117
Retired participants and beneficiaries	\$16,117	
Active participants	0	
Inactive participants	0	
6. Actuarial value of assets		16,117
7. Unfunded actuarial accrued liability: (5) - (6)		\$0

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	\$0	0.00%
2. Projected unfunded actuarial accrued liability	0	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	0	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	<u>0</u>	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$0	0.00%
8. Total FY15 Appropriation, payable on July 1	0	0.00%
9. Projected payroll	0	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing	\$0	\$0
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	0	0
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	<u>0</u>	<u>0</u>
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$0	\$0
7. Total Appropriation, payable on July 1	0	0

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Shawsheen Valley RVS

5300

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 5 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	39
2. Participants active during the year ended December 31, 2013	62
3. Inactive participants entitled to a return of their employee contributions	10
4. Inactive participants with a vested right to a deferred or immediate benefit	4

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$280,070
2. Administrative expenses		18,266
3. Expected employee contributions		<u>-245,869</u>
4. Employer normal cost: (1) + (2) + (3)		\$52,467
5. Actuarial accrued liability		11,277,578
Retired participants and beneficiaries	\$5,946,899	
Active participants	4,930,668	
Inactive participants	400,011	
6. Actuarial value of assets		4,338,318
7. Unfunded actuarial accrued liability: (5) - (6)		\$6,939,260

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$54,530	2.05%
2. Projected unfunded actuarial accrued liability	7,207,316	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	385,325	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	17,422	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$457,277	17.20%
8. Total FY15 Appropriation, payable on July 1	448,563	16.88%
9. Projected payroll	2,658,135	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$56,711	\$58,979
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	456,145	489,197
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	17,422	17,422
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$530,278	\$565,598
7. Total Appropriation, payable on July 1	520,323	554,980

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for South Middlesex RVTS

5400

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 4 beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	42
2. Participants active during the year ended December 31, 2013	51
3. Inactive participants entitled to a return of their employee contributions	14
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$268,752
2. Administrative expenses		17,528
3. Expected employee contributions		-208,557
4. Employer normal cost: (1) + (2) + (3)		\$77,723
5. Actuarial accrued liability		10,846,770
Retired participants and beneficiaries	\$5,215,051	
Active participants	5,566,375	
Inactive participants	65,344	
6. Actuarial value of assets		4,706,327
7. Unfunded actuarial accrued liability: (5) - (6)		\$6,140,443

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$80,779	3.54%
2. Projected unfunded actuarial accrued liability	6,377,642	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	378,168	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$458,947	20.13%
8. Total FY15 Appropriation, payable on July 1	450,201	19.74%
9. Projected payroll	2,280,248	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$84,010	\$87,370
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	406,289	435,728
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$490,299	\$523,098
7. Total Appropriation, payable on July 1	481,095	513,278

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

##### Summary of Actuarial Valuation Results for Sudbury Water District

5500

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 1 beneficiary in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	2
2. Participants active during the year ended December 31, 2013	8
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$56,523
2. Administrative expenses		3,686
3. Expected employee contributions		<u>-68,505</u>
4. Employer normal cost: (1) + (2) + (3)		<u>-\$8,296</u>
5. Actuarial accrued liability		3,104,746
Retired participants and beneficiaries	\$232,944	
Active participants	2,871,802	
Inactive participants	0	
6. Actuarial value of assets		1,695,304
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$1,409,442</u>

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	-\$8,622	- 1.09%
2. Projected unfunded actuarial accrued liability	1,463,887	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	95,595	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	<u>0</u>	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$86,973	11.01%
8. Total FY15 Appropriation, payable on July 1	85,316	10.80%
9. Projected payroll	789,617	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing	-\$8,967	-\$9,326
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	92,674	99,389
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	<u>0</u>	<u>0</u>
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$83,707	\$90,063
7. Total Appropriation, payable on July 1	82,136	88,372

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Tewksbury Housing Authority

5600

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 1 beneficiary in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	4
2. Participants active during the year ended December 31, 2013	7
3. Inactive participants entitled to a return of their employee contributions	1
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$42,355
2. Administrative expenses		2,762
3. Expected employee contributions		<u>-32,590</u>
4. Employer normal cost: (1) + (2) + (3)		\$12,527
5. Actuarial accrued liability		2,161,698
Retired participants and beneficiaries	\$1,104,086	
Active participants	1,051,465	
Inactive participants	6,147	
6. Actuarial value of assets		969,610
7. Unfunded actuarial accrued liability: (5) - (6)		\$1,192,088

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$13,019	3.72%
2. Projected unfunded actuarial accrued liability	1,238,137	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	58,714	
4. Payment on 2002 ERI, adjusted for timing	3,459	
5. Payment on 2003 ERI, adjusted for timing	5,565	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$80,757	23.11%
8. Total FY15 Appropriation, payable on July 1	79,218	22.67%
9. Projected payroll	349,505	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$13,540	\$14,082
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	77,011	82,591
3. Payment on 2002 ERI, adjusted for timing	3,459	3,459
4. Payment on 2003 ERI, adjusted for timing	5,565	5,565
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$99,575	\$105,697
7. Total Appropriation, payable on July 1	97,706	103,713

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.



### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Wayland Housing Authority

5700

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	1
2. Participants active during the year ended December 31, 2013	4
3. Inactive participants entitled to a return of their employee contributions	2
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$25,144
2. Administrative expenses		1,640
3. Expected employee contributions		<u>-23,671</u>
4. Employer normal cost: (1) + (2) + (3)		\$3,113
5. Actuarial accrued liability		1,002,756
Retired participants and beneficiaries	\$108,131	
Active participants	887,034	
Inactive participants	7,591	
6. Actuarial value of assets		580,329
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$422,427</u>

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$3,235	1.26%
2. Projected unfunded actuarial accrued liability	438,745	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	31,976	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$35,211	13.76%
8. Total FY15 Appropriation, payable on July 1	34,540	13.50%
9. Projected payroll	255,929	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$3,364	\$3,499
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	27,555	29,551
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$30,919	\$33,050
7. Total Appropriation, payable on July 1	30,339	32,430

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Hopkinton Housing Authority

5800

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	0
2. Participants active during the year ended December 31, 2013	3
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$16,569
2. Administrative expenses		1,081
3. Expected employee contributions		<u>-15,430</u>
4. Employer normal cost: (1) + (2) + (3)		\$2,220
5. Actuarial accrued liability		891,361
Retired participants and beneficiaries	\$0	
Active participants	891,361	
Inactive participants	0	
6. Actuarial value of assets		483,895
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$407,466</u>

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$2,307	1.32%
2. Projected unfunded actuarial accrued liability	423,206	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	23,818	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$26,125	14.96%
8. Total FY15 Appropriation, payable on July 1	25,627	14.68%
9. Projected payroll	174,612	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$2,399	\$2,495
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	27,045	29,005
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$29,444	\$31,500
7. Total Appropriation, payable on July 1	28,891	30,909

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Sudbury Housing Authority

6000

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	3
2. Participants active during the year ended December 31, 2013	3
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$13,360
2. Administrative expenses		871
3. Expected employee contributions		<u>-8,453</u>
4. Employer normal cost: (1) + (2) + (3)		\$5,778
5. Actuarial accrued liability		758,708
Retired participants and beneficiaries	\$621,699	
Active participants	137,009	
Inactive participants	0	
6. Actuarial value of assets		495,756
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$262,952</u>

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	\$6,005	6.26%
2. Projected unfunded actuarial accrued liability	273,110	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	22,670	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	<u>0</u>	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$28,675	29.87%
8. Total FY15 Appropriation, payable on July 1	28,129	29.30%
9. Projected payroll	95,991	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing	\$6,245	\$6,495
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	16,969	18,198
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	<u>0</u>	<u>0</u>
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$23,214	\$24,693
7. Total Appropriation, payable on July 1	22,778	24,229

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Wilmington Housing Authority

6100

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	4
2. Participants active during the year ended December 31, 2013	3
3. Inactive participants entitled to a return of their employee contributions	2
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$14,186
2. Administrative expenses		925
3. Expected employee contributions		-11,110
4. Employer normal cost: (1) + (2) + (3)		\$4,001
5. Actuarial accrued liability		463,956
Retired participants and beneficiaries	\$328,001	
Active participants	132,446	
Inactive participants	3,509	
6. Actuarial value of assets		203,041
7. Unfunded actuarial accrued liability: (5) - (6)		\$260,915

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$4,158	3.51%
2. Projected unfunded actuarial accrued liability	270,994	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	14,198	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	3,563	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$21,919	18.52%
8. Total FY15 Appropriation, payable on July 1	21,501	18.17%
9. Projected payroll	118,334	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$4,324	\$4,497
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	16,204	17,378
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	3,563	3,563
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$24,091	\$25,438
7. Total Appropriation, payable on July 1	23,639	24,960

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Acton Housing Authority

6200

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 1 beneficiary in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	3
2. Participants active during the year ended December 31, 2013	6
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$40,767
2. Administrative expenses		2,659
3. Expected employee contributions		<u>-31,064</u>
4. Employer normal cost: (1) + (2) + (3)		\$12,362
5. Actuarial accrued liability		1,579,485
Retired participants and beneficiaries	\$519,776	
Active participants	1,059,709	
Inactive participants	0	
6. Actuarial value of assets		797,448
7. Unfunded actuarial accrued liability: (5) - (6)		\$782,037

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$12,848	3.80%
2. Projected unfunded actuarial accrued liability	812,246	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	47,545	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$60,393	17.88%
8. Total FY15 Appropriation, payable on July 1	59,242	17.54%
9. Projected payroll	337,839	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$13,362	\$13,896
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	51,785	55,538
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$65,147	\$69,434
7. Total Appropriation, payable on July 1	63,924	68,131

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Burlington Housing Authority

6300

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	0
2. Participants active during the year ended December 31, 2013	5
3. Inactive participants entitled to a return of their employee contributions	1
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$29,852
2. Administrative expenses		1,947
3. Expected employee contributions		<u>-23,864</u>
4. Employer normal cost: (1) + (2) + (3)		\$7,935
5. Actuarial accrued liability		681,485
Retired participants and beneficiaries	\$0	
Active participants	678,878	
Inactive participants	2,607	
6. Actuarial value of assets		574,706
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$106,779</u>

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$8,247	3.24%
2. Projected unfunded actuarial accrued liability	110,904	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	13,393	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$21,640	8.50%
8. Total FY15 Appropriation, payable on July 1	21,228	8.33%
9. Projected payroll	254,693	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$8,577	\$8,920
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	6,613	7,092
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$15,190	\$16,012
7. Total Appropriation, payable on July 1	14,905	15,711

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Ayer Housing Authority

6400

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	1
2. Participants active during the year ended December 31, 2013	3
3. Inactive participants entitled to a return of their employee contributions	1
4. Inactive participants with a vested right to a deferred or immediate benefit	1

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$17,127
2. Administrative expenses		1,117
3. Expected employee contributions		<u>-15,425</u>
4. Employer normal cost: (1) + (2) + (3)		\$2,819
5. Actuarial accrued liability		681,668
Retired participants and beneficiaries	\$107,919	
Active participants	528,137	
Inactive participants	45,612	
6. Actuarial value of assets		280,089
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$401,579</u>

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$2,930	1.78%
2. Projected unfunded actuarial accrued liability	417,092	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	26,774	
4. Payment on 2002 ERI, adjusted for timing	3,557	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$33,261	20.16%
8. Total FY15 Appropriation, payable on July 1	32,627	19.77%
9. Projected payroll	165,017	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$3,047	\$3,169
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	25,415	27,257
3. Payment on 2002 ERI, adjusted for timing	3,557	3,557
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$32,019	\$33,983
7. Total Appropriation, payable on July 1	31,418	33,345

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Holliston Housing Authority

6500

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	1
2. Participants active during the year ended December 31, 2013	3
3. Inactive participants entitled to a return of their employee contributions	1
4. Inactive participants with a vested right to a deferred or immediate benefit	1

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$18,864
2. Administrative expenses		1,230
3. Expected employee contributions		<u>-13,191</u>
4. Employer normal cost: (1) + (2) + (3)		\$6,903
5. Actuarial accrued liability		379,435
Retired participants and beneficiaries	\$116,598	
Active participants	203,593	
Inactive participants	59,244	
6. Actuarial value of assets		191,652
7. Unfunded actuarial accrued liability: (5) - (6)		\$187,783

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$7,174	5.22%
2. Projected unfunded actuarial accrued liability	195,037	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	8,259	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$15,433	11.23%
8. Total FY15 Appropriation, payable on July 1	15,139	11.02%
9. Projected payroll	137,369	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$7,461	\$7,759
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	12,644	13,561
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$20,105	\$21,320
7. Total Appropriation, payable on July 1	19,728	20,920

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.



### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Littleton Housing Authority

6600

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	2
2. Participants active during the year ended December 31, 2013	2
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$5,177
2. Administrative expenses		338
3. Expected employee contributions		<u>-3,248</u>
4. Employer normal cost: (1) + (2) + (3)		\$2,267
5. Actuarial accrued liability		590,055
Retired participants and beneficiaries	\$574,776	
Active participants	15,279	
Inactive participants	0	
6. Actuarial value of assets		229,214
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$360,841</u>

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	\$2,356	6.40%
2. Projected unfunded actuarial accrued liability	374,780	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	17,302	
4. Payment on 2002 ERI, adjusted for timing	4,842	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	<u>0</u>	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$24,500	66.57%
8. Total FY15 Appropriation, payable on July 1	24,033	65.30%
9. Projected payroll	36,804	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing	\$2,450	\$2,548
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	22,813	24,466
3. Payment on 2002 ERI, adjusted for timing	4,842	4,842
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	<u>0</u>	<u>0</u>
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$30,105	\$31,856
7. Total Appropriation, payable on July 1	29,540	31,258

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Westford Housing Authority

6700

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	1
2. Participants active during the year ended December 31, 2013	4
3. Inactive participants entitled to a return of their employee contributions	1
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$21,180
2. Administrative expenses		1,381
3. Expected employee contributions		<u>-18,369</u>
4. Employer normal cost: (1) + (2) + (3)		\$4,192
5. Actuarial accrued liability		731,941
Retired participants and beneficiaries	\$163,209	
Active participants	567,665	
Inactive participants	1,067	
6. Actuarial value of assets		337,889
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$394,052</u>

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	\$4,357	2.21%
2. Projected unfunded actuarial accrued liability	409,274	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	20,695	
4. Payment on 2002 ERI, adjusted for timing	6,818	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	<u>0</u>	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$31,870	16.20%
8. Total FY15 Appropriation, payable on July 1	31,263	15.89%
9. Projected payroll	196,781	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing	\$4,531	\$4,712
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	24,355	26,119
3. Payment on 2002 ERI, adjusted for timing	6,818	6,818
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	<u>0</u>	<u>0</u>
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$35,704	\$37,649
7. Total Appropriation, payable on July 1	35,034	36,942

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

##### Summary of Actuarial Valuation Results for Shirley Water District

6800

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 1 beneficiary in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	1
2. Participants active during the year ended December 31, 2013	3
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$13,641
2. Administrative expenses		890
3. Expected employee contributions		<u>-17,982</u>
4. Employer normal cost: (1) + (2) + (3)		<u>-\$3,451</u>
5. Actuarial accrued liability		707,435
Retired participants and beneficiaries	\$68,936	
Active participants	638,499	
Inactive participants	0	
6. Actuarial value of assets		375,167
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$332,268</u>

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	-\$3,587	- 1.84%
2. Projected unfunded actuarial accrued liability	345,103	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	21,183	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	<u>0</u>	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$17,596	9.02%
8. Total FY15 Appropriation, payable on July 1	17,261	8.84%
9. Projected payroll	195,155	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing	-\$3,730	-\$3,879
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	21,937	23,527
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	<u>0</u>	<u>0</u>
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$18,207	\$19,648
7. Total Appropriation, payable on July 1	17,865	19,279

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Tyngsboro Housing Authority

6900

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	2
2. Participants active during the year ended December 31, 2013	3
3. Inactive participants entitled to a return of their employee contributions	1
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$15,187
2. Administrative expenses		990
3. Expected employee contributions		<u>-12,825</u>
4. Employer normal cost: (1) + (2) + (3)		\$3,352
5. Actuarial accrued liability		536,189
Retired participants and beneficiaries	\$386,506	
Active participants	147,876	
Inactive participants	1,807	
6. Actuarial value of assets		154,883
7. Unfunded actuarial accrued liability: (5) - (6)		\$381,306

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$3,484	2.58%
2. Projected unfunded actuarial accrued liability	396,035	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	17,654	
4. Payment on 2002 ERI, adjusted for timing	4,349	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$25,487	18.85%
8. Total FY15 Appropriation, payable on July 1	25,001	18.49%
9. Projected payroll	135,214	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$3,623	\$3,768
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	24,369	26,135
3. Payment on 2002 ERI, adjusted for timing	4,349	4,349
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$32,341	\$34,252
7. Total Appropriation, payable on July 1	31,734	33,609

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Pepperell Housing Authority

7000

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	1
2. Participants active during the year ended December 31, 2013	2
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$8,610
2. Administrative expenses		562
3. Expected employee contributions		<u>-6,672</u>
4. Employer normal cost: (1) + (2) + (3)		\$2,500
5. Actuarial accrued liability		216,943
Retired participants and beneficiaries	\$202,773	
Active participants	14,170	
Inactive participants	0	
6. Actuarial value of assets		121,473
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$95,470</u>

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	\$2,598	3.58%
2. Projected unfunded actuarial accrued liability	99,158	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	4,895	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	<u>0</u>	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$7,493	10.32%
8. Total FY15 Appropriation, payable on July 1	7,350	10.13%
9. Projected payroll	72,586	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing	\$2,702	\$2,810
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	6,382	6,845
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	<u>0</u>	<u>0</u>
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$9,084	\$9,655
7. Total Appropriation, payable on July 1	8,913	9,474

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Groton Housing Authority

7100

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	0
2. Participants active during the year ended December 31, 2013	1
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$3,463
2. Administrative expenses		226
3. Expected employee contributions		<u>-2,334</u>
4. Employer normal cost: (1) + (2) + (3)		\$1,355
5. Actuarial accrued liability		76,073
Retired participants and beneficiaries	\$0	
Active participants	76,073	
Inactive participants	0	
6. Actuarial value of assets		63,034
7. Unfunded actuarial accrued liability: (5) - (6)		\$13,039

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$1,408	5.32%
2. Projected unfunded actuarial accrued liability	13,543	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	1,362	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	<u>0</u>	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$2,770	10.47%
8. Total FY15 Appropriation, payable on July 1	2,717	10.27%
9. Projected payroll	26,447	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$1,464	\$1,523
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	826	885
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	<u>0</u>	<u>0</u>
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$2,290	\$2,408
7. Total Appropriation, payable on July 1	2,247	2,363

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for Tyngsboro Water District

7200

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	1
2. Participants active during the year ended December 31, 2013	7
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$20,580
2. Administrative expenses		1,342
3. Expected employee contributions		<u>-16,797</u>
4. Employer normal cost: (1) + (2) + (3)		\$5,125
5. Actuarial accrued liability		811,169
Retired participants and beneficiaries	\$236,552	
Active participants	574,617	
Inactive participants	0	
6. Actuarial value of assets		469,579
7. Unfunded actuarial accrued liability: (5) - (6)		\$341,590

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$5,326	2.93%
2. Projected unfunded actuarial accrued liability	354,785	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	14,868	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$20,194	11.11%
8. Total FY15 Appropriation, payable on July 1	19,809	10.90%
9. Projected payroll	181,790	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$5,539	\$5,761
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	23,011	24,679
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$28,550	\$30,440
7. Total Appropriation, payable on July 1	28,014	29,869

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for North Reading Housing Authority

7400

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	1
2. Participants active during the year ended December 31, 2013	3
3. Inactive participants entitled to a return of their employee contributions	1
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$10,956
2. Administrative expenses		715
3. Expected employee contributions		-7,287
4. Employer normal cost: (1) + (2) + (3)		\$4,384
5. Actuarial accrued liability		187,846
Retired participants and beneficiaries	\$67,686	
Active participants	117,160	
Inactive participants	3,000	
6. Actuarial value of assets		101,462
7. Unfunded actuarial accrued liability: (5) - (6)		\$86,384

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$4,556	5.52%
2. Projected unfunded actuarial accrued liability	89,721	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	5,242	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$9,798	11.88%
8. Total FY15 Appropriation, payable on July 1	9,611	11.65%
9. Projected payroll	82,494	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$4,738	\$4,928
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	5,721	6,135
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$10,459	\$11,063
7. Total Appropriation, payable on July 1	10,263	10,855

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.



### SECTION 3: Supplemental Information for the Middlesex County Retirement System

#### Unit Results (Continued)

#### Summary of Actuarial Valuation Results for West Groton Water

7500

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	0
2. Participants active during the year ended December 31, 2013	3
3. Inactive participants entitled to a return of their employee contributions	0
4. Inactive participants with a vested right to a deferred or immediate benefit	0

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$20,090
2. Administrative expenses		1,310
3. Expected employee contributions		<u>-16,763</u>
4. Employer normal cost: (1) + (2) + (3)		\$4,637
5. Actuarial accrued liability		99,559
Retired participants and beneficiaries	\$0	
Active participants	99,559	
Inactive participants	0	
6. Actuarial value of assets		87,546
7. Unfunded actuarial accrued liability: (5) - (6)		\$12,013

The actuarial factors projected to FY15 are as follows:

	Amount	% of Payroll
1. Projected employer normal cost, adjusted for timing	\$4,819	2.71%
2. Projected unfunded actuarial accrued liability	12,477	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	2,198	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$7,017	3.94%
8. Total FY15 Appropriation, payable on July 1	6,883	3.87%
9. Projected payroll	177,915	

The actuarial factors projected to FY16 and FY17 are as follows:

	FY16	FY17
1. Projected employer normal cost, adjusted for timing	\$5,012	\$5,212
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	698	749
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$5,710	\$5,961
7. Total Appropriation, payable on July 1	5,603	5,849

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

### SECTION 3: Unit Results for the Middlesex County Retirement System

#### Unit Results (Continued)

##### Summary of Actuarial Valuation Results for Ayer-Shirley RSD

7600

The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including no beneficiaries in pay status, no retired participants in suspended status and no beneficiaries in suspended status)	4
2. Participants active during the year ended December 31, 2013	120
3. Inactive participants entitled to a return of their employee contributions	7
4. Inactive participants with a vested right to a deferred or immediate benefit	1

The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost		\$420,426
2. Administrative expenses		27,420
3. Expected employee contributions		<u>-343,977</u>
4. Employer normal cost: (1) + (2) + (3)		\$103,869
5. Actuarial accrued liability		9,025,262
Retired participants and beneficiaries	\$1,044,707	
Active participants	7,951,201	
Inactive participants	29,354	
6. Actuarial value of assets		4,637,459
7. Unfunded actuarial accrued liability: (5) - (6)		<u>\$4,387,803</u>

The actuarial factors projected to FY15 are as follows:

	<u>Amount</u>	<u>% of Payroll</u>
1. Projected employer normal cost, adjusted for timing	\$107,953	2.86%
2. Projected unfunded actuarial accrued liability	4,557,299	
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	187,162	
4. Payment on 2002 ERI, adjusted for timing	0	
5. Payment on 2003 ERI, adjusted for timing	0	
6. Payment on 2010 ERI, adjusted for timing	0	
7. Total FY15 Appropriation: (1) + (3) + (4) + (5) + (6)	\$295,115	7.81%
8. Total FY15 Appropriation, payable on July 1	289,491	7.67%
9. Projected payroll	3,776,581	

The actuarial factors projected to FY16 and FY17 are as follows:

	<u>FY16</u>	<u>FY17</u>
1. Projected employer normal cost, adjusted for timing	\$112,271	\$116,762
2. Payment on projected unfunded actuarial accrued liability, adjusted for timing	295,837	317,273
3. Payment on 2002 ERI, adjusted for timing	0	0
4. Payment on 2003 ERI, adjusted for timing	0	0
5. Payment on 2010 ERI, adjusted for timing	0	0
6. Total Appropriation: (1) + (2) + (3) + (4) + (5)	\$408,108	\$434,035
7. Total Appropriation, payable on July 1	400,447	425,887

Note: Recommended contributions are assumed to be paid on July 1 and December 31, unless otherwise noted.

## SECTION 4: Supplemental Information for the Middlesex County Retirement System

### EXHIBIT A

#### Table of Plan Coverage

Category	Year Ended December 31		Change From Prior Year
	2013	2011	
Active participants in valuation:			
Number	9,082	8,979	1.1%
Average age	48.3	48.3	N/A
Average years of service	11.7	11.4	N/A
Total payroll*	\$398,185,255	\$375,701,790	6.0%
Average payroll*	43,843	41,842	4.8%
Member contributions	354,110,505	332,262,183	6.6%
Number with unknown age	66	60	10.0%
Inactive participants with a vested right to a deferred or immediate benefit	384	394	-2.5%
Inactive participants entitled to a return of their employee contributions	2,632	2,708	-2.8%
Retired participants:			
Number in pay status	4,013	3,823	5.0%
Average age	73.7	73.5	N/A
Average monthly benefit	\$1,926	\$1,780	8.2%
Number with benefits in suspended status	2	0	N/A
Disabled participants:			
Number in pay status	446	454	-1.8%
Average age	66.1	65.5	N/A
Average monthly benefit	\$2,651	\$2,512	5.5%
Number with benefits in suspended status	1	0	N/A
Beneficiaries in pay status:			
Number in pay status	613	609	0.7%
Average age	75.6	75.0	N/A
Average monthly benefit	\$1,073	\$1,003	7.0%
Number with benefits in suspended status	2	0	N/A

\* Payroll figures are for the prior calendar year and reflect annualized salaries for participants hired during the year.

## SECTION 4: Supplemental Information for the Middlesex County Retirement System

### EXHIBIT B

#### Participants in Active Service as of December 31, 2013 By Age, Years of Service, and Average Payroll

Age	Years of Service									
	Total	0-4	5-9	10-14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	268	265	3	--	--	--	--	--	--	--
	\$26,777	\$26,646	\$38,339	--	--	--	--	--	--	--
25 - 29	660	545	114	1	--	--	--	--	--	--
	\$34,540	\$32,892	\$41,888	\$95,136	--	--	--	--	--	--
30 - 34	583	272	226	83	2	--	--	--	--	--
	\$45,115	\$37,928	\$49,573	\$56,627	\$40,796	--	--	--	--	--
35 - 39	557	161	159	177	56	4	--	--	--	--
	\$49,737	\$31,441	\$53,110	\$59,656	\$61,756	\$44,950	--	--	--	--
40 - 44	1,015	296	202	223	223	61	10	--	--	--
	\$49,479	\$28,166	\$44,257	\$58,425	\$67,166	\$70,652	\$62,812	--	--	--
45 - 49	1,390	339	335	264	190	130	120	12	--	--
	\$45,773	\$28,791	\$34,187	\$44,556	\$61,288	\$72,313	\$73,708	\$63,180	--	--
50 - 54	1,606	283	381	366	196	115	190	70	5	--
	\$44,905	\$30,658	\$32,793	\$37,868	\$50,321	\$63,167	\$73,963	\$79,953	\$62,265	--
55 - 59	1,522	190	301	382	263	126	131	78	43	8
	\$44,002	\$31,967	\$33,820	\$37,482	\$41,908	\$55,553	\$65,853	\$77,965	\$70,476	\$79,979
60 - 64	931	76	135	211	194	111	97	59	32	16
	\$44,227	\$33,344	\$36,310	\$39,478	\$41,491	\$43,016	\$57,778	\$55,438	\$77,815	\$76,223
65 - 69	374	21	62	71	56	65	60	27	8	4
	\$39,929	\$24,015	\$34,468	\$39,713	\$36,449	\$45,063	\$43,916	\$43,893	\$58,480	\$53,564
70 & over	110	3	14	28	21	11	9	9	7	8
	\$33,882	\$17,063	\$23,997	\$26,484	\$36,906	\$28,708	\$47,745	\$49,117	\$37,280	\$46,846
Unknown	66	51	7	1	1	2	1	1	1	1
	\$21,778	\$18,829	\$19,523	\$42,667	\$45,493	\$35,321	\$6,174	\$55,498	\$45,903	\$74,024
Total	9,082	2,502	1,939	1,807	1,202	625	618	256	96	37
	\$43,843	\$30,880	\$38,740	\$44,415	\$51,546	\$57,991	\$66,065	\$67,928	\$68,818	\$68,174

**SECTION 4: Supplemental Information for the Middlesex County Retirement System**

**EXHIBIT C**

**Summary Statement of Income and Expenses on an Actuarial Value Basis**

	<b>Year Ended December 31, 2013</b>	<b>Year Ended December 31, 2012</b>
<b>Net assets at actuarial value at the beginning of the year</b>	\$875,989,750	\$862,323,395
<b>Contribution income:</b>		
Employer contributions	\$88,252,356	\$81,896,208
Employee contributions	38,568,968	35,766,080
Federal grant reimbursement and other contributions	34,756	37,240
Less administrative expenses	<u>-3,170,834</u>	<u>-3,051,893</u>
Net contribution income	123,685,246	114,647,635
<b>Net investment income:</b>	<u>88,945,014</u>	<u>15,213,243</u>
<b>Total income available for benefits</b>	\$212,630,260	\$129,860,878
<b>Less benefit payments:</b>		
Pensions	-\$113,672,976	-\$108,521,773
Net 3(8)(c) reimbursements	-5,046,208	-4,848,798
Refunds, annuities, & Option B refunds	<u>-2,754,808</u>	<u>-2,823,952</u>
Net benefit payments	-\$121,473,992	-\$116,194,523
<b>Change in reserve for future benefits</b>	\$91,156,268	\$13,666,355
<b>Net assets at actuarial value at the end of the year</b>	\$967,146,018	\$875,989,750

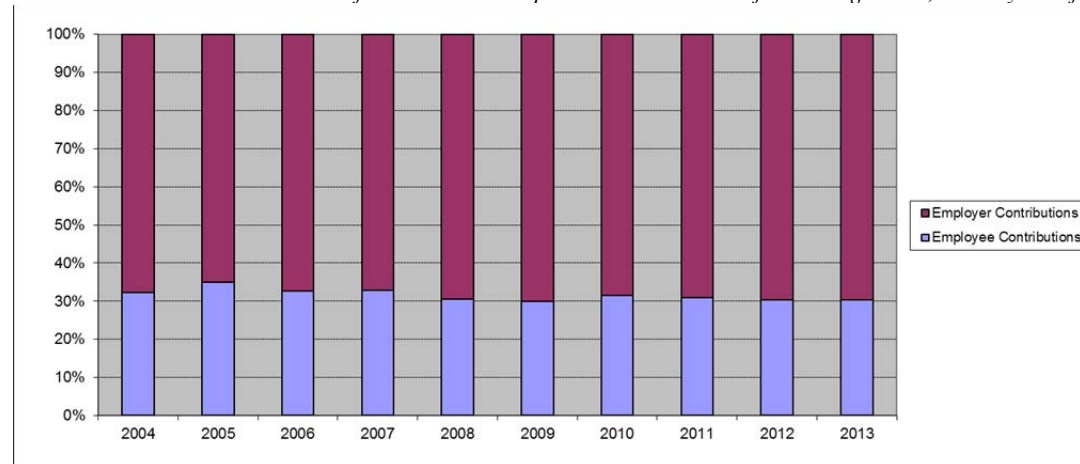
## SECTION 4: Supplemental Information for the Middlesex County Retirement System

### EXHIBIT D

#### Development of the Fund Through December 31, 2013 and Comparison of Employer and Employee Contributions

Year Ended December 31	Employer Contributions	Employee Contributions	Employee Contributions as a Percent of Total Contributions	Other Contributions	Net Investment Return	Administrative Expenses	Benefit Payments	Actuarial Value of Assets at End of Year
2004	\$52,708,663	\$25,259,767	32.32%	\$193,703	\$11,844,337	\$0	\$76,958,686	\$631,211,164
2005	52,141,963	28,088,359	34.94%	156,187	22,046,916	0	80,487,723	653,156,866
2006	59,949,757	29,202,011	32.67%	219,960	42,522,819	0	85,096,827	699,954,587
2007	64,408,516	31,581,761	32.81%	256,313	67,081,999	0	88,419,506	774,863,669
2008	71,923,886	31,686,242	30.54%	126,432	-68,010,444	2,930,164	92,969,048	714,690,573
2009	78,120,707	33,567,538	30.03%	91,414	92,107,036	2,814,190	95,775,164	819,987,914
2010	76,087,532	35,031,485	31.51%	59,431	20,487,695	3,042,747	101,242,424	847,368,886
2011	78,594,607	35,094,482	30.85%	67,607	10,333,913	3,075,272	106,060,828	862,323,395
2012	81,896,208	35,766,080	30.39%	37,240	15,213,243	3,051,893	116,194,523	875,989,750
2013	88,252,356	38,568,968	30.40%	34,756	88,945,014	3,170,834	121,473,992	967,146,018

*Note: Net investment return is net of administrative expenses and investment fees through 2007, but only net of investment fees for 2008 and later.*



*Note: Other contributions have been included with employer contribution for the purposes of this graph.*

## SECTION 4: Supplemental Information for the Middlesex County Retirement System

### EXHIBIT E

#### Table of Amortization Bases

Type	Outstanding Balance as of July 1, 2014	Annual Fiscal 2015 Payment	Outstanding Balance as of July 1, 2015	Annual Fiscal 2016 Payment	Rate of Increase	Years Remaining as of July 1, 2014
2002 ERI	\$7,107,387	\$1,676,175	\$5,892,864	\$1,676,175	0.0%	5
2003 ERI	3,604,051	733,735	3,111,212	733,735	0.0%	6
2010 ERI	372,492	60,947	337,314	60,947	0.0%	8
Remaining unfunded liability	<u>1,264,961,451</u>	<u>75,111,276</u>	<u>1,285,071,926</u>	<u>80,577,643</u>	N/A	21
Total	\$1,276,045,381	\$77,582,133	\$1,294,413,316	\$83,048,500		

*Notes: Recommended contributions are assumed to be paid in two equal installments on July 1 and December 31.*

*Recommended contribution for fiscal 2016 is calculated to increase 6.5% over fiscal 2015.*

*Fiscal 2015 appropriation is budgeted amount determined in prior valuation.*

## SECTION 4: Supplemental Information for the Middlesex County Retirement System

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### EXHIBIT F

#### Definitions of Pension Terms

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The following list defines certain technical terms for the convenience of the reader:

**Assumptions or actuarial assumptions:**

The estimates on which the cost of the Plan is calculated including:

- (a) Investment return — the rate of investment yield that the Plan will earn over the long-term future;
- (b) Mortality rates — the death rates of employees and pensioners; life expectancy is based on these rates;
- (c) Retirement rates — the rate or probability of retirement at a given age;
- (d) Withdrawal rates — the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement.

**Normal cost:**

The amount of contributions required to fund the benefit allocated to the current year of service.

**Actuarial accrued liability for actives:**

The value of all projected benefit payments for current members less the portion that will be paid by future normal costs.

**Actuarial accrued liability for pensioners:**

The single-sum value of lifetime benefits to existing pensioners. This sum takes account of life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.

**Unfunded actuarial accrued liability:**

The extent to which the actuarial accrued liability of the Plan exceeds the assets of the Plan. There are many approaches to paying off the unfunded actuarial accrued liability, from meeting the interest accrual only to amortizing it over a specific period of time.



#### SECTION 4: Supplemental Information for the Middlesex County Retirement System

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**Amortization of the unfunded  
actuarial accrued liability:**

Payments made over a period of years equal in value to the Plan's unfunded actuarial accrued liability.

**Investment return:**

The rate of earnings of the Plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.

## SECTION 5: Reporting Information for the Middlesex County Retirement System

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### EXHIBIT I

#### Summary of Actuarial Valuation Results

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The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 613 beneficiaries in pay status, 3 retired participants in suspended status and 2 beneficiaries in suspended status)	5,077
2. Participants active during the year ended December 31, 2013 (including 66 participants with unknown age) with total accumulated contributions of \$354,110,505 and with projected 2014 payroll of \$415,752,810	9,082
3. Inactive participants with a right to a return of their employee contributions as of December 31, 2013	2,632
4. Inactive participants with a vested right to a deferred or immediate benefit as of December 31, 2013	384

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The actuarial factors as of January 1, 2014 are as follows:

1. Normal cost	\$52,132,389
2. Administrative expenses	3,400,000
3. Expected employee contributions	<u>-39,232,068</u>
4. Employer normal cost: (1) + (2) + (3)	\$16,300,321
5. Actuarial accrued liability	2,195,732,452
Retired participants and beneficiaries	\$1,076,311,992
Active participants	1,084,015,968
Inactive participants	35,404,492
6. Actuarial value of assets (\$1,014,013,415 at market value as reported in the Annual Statement)	\$967,146,018
7. Unfunded actuarial accrued liability: (5) – (6)	1,228,586,434

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The actuarial factors projected to July 1, 2014 are as follows:

1. Projected employer normal cost, adjusted for timing	\$16,941,148
2. Projected unfunded actuarial accrued liability	1,276,045,381
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	77,582,133
4. Recommended contribution: (1) + (3)	94,523,281
5. Projected payroll	423,986,338

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*Note: Recommended contributions are assumed to be paid in two equal installments on July 1 and December 31.*

**SECTION 5: Reporting Information for the Middlesex County Retirement System**

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**EXHIBIT II**

**Supplementary Information Required by the GASB – History of Employer Contributions**

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<b>Plan Year Ended December 31</b>	<b>Annual Required Contributions (ARC)</b>	<b>Actual Contributions</b>	<b>Percentage Contributed</b>
2004	\$52,902,366	\$52,902,366	100.0%
2005	52,298,150	52,298,150	100.0%
2006	60,169,717	60,169,717	100.0%
2007	64,664,829	64,664,829	100.0%
2008	72,050,318	72,050,318	100.0%
2009	78,212,121	78,212,121	100.0%
2010	76,146,963	76,146,963	100.0%
2011	78,662,214	78,662,214	100.0%
2012	81,933,448	81,933,448	100.0%
2013	88,287,112	88,287,112	100.0%

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**SECTION 5: Reporting Information for the Middlesex County Retirement System**

**EXHIBIT III**

**Supplementary Information Required by the GASB – Schedule of Funding Progress**

<b>Actuarial Valuation Date</b>	<b>Actuarial Value of Assets (a)</b>	<b>Actuarial Accrued Liability (AAL) (b)</b>	<b>Unfunded/ (Overfunded) AAL (UAAL) (b) - (a)</b>	<b>Funded Ratio (a) / (b)</b>	<b>Covered Payroll (c)</b>	<b>UAAL as a Percentage of Covered Payroll [(b) - (a)] / (c)</b>
01/01/1996	\$373,750,361	\$634,920,488	\$261,170,127	58.87%	\$218,345,024	119.61%
01/01/1998	476,708,969	763,093,878	286,384,909	62.47%	215,380,186	132.97%
01/01/2000	570,263,467	905,280,472	335,017,005	62.99%	253,228,818	132.30%
01/01/2002	599,699,143	1,020,828,178	421,129,035	58.75%	280,740,439	150.01%
01/01/2004	618,163,380	1,223,828,127	605,664,747	50.51%	306,025,949	197.91%
01/01/2006	653,156,866	1,364,582,969	711,426,103	47.86%	330,999,861	214.93%
01/01/2008	774,863,669	1,529,806,307	754,942,638	50.65%	360,206,302	209.59%
01/01/2010	819,987,914	1,743,581,707	923,593,793	47.03%	384,933,571	239.94%
01/01/2012	862,323,395	1,974,144,909	1,111,821,514	43.68%	393,100,995	282.83%
01/01/2014	967,146,018	2,195,732,452	1,228,586,434	44.05%	415,752,810	295.51%

## SECTION 5: Reporting Information for the Middlesex County Retirement System

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### EXHIBIT IV

#### Supplementary Information Required by the GASB

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<b>Valuation date</b>	January 1, 2014
<b>Actuarial cost method</b>	Entry Age Normal Cost Method
<b>Amortization method</b>	Prior year's total contribution increased by 6.5% for fiscal 2016 through fiscal 2020, and thereafter the remaining unfunded liability will be amortized on a 4.0% annual increasing basis; ERI liability amortized in level payments
<b>Remaining amortization period</b>	As of July 1, 2014, 5 years remaining for 2002 ERI liability, 6 years remaining for 2003 ERI liability, 8 years remaining for 2010 ERI liability and 21 years for remaining unfunded liability.
<b>Asset valuation method</b>	The difference between the expected return and the actual investment return on a market value basis is recognized over a five-year period. Asset value is adjusted as necessary to be within 20% of the market value.

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<b>Actuarial assumptions:</b>	
Investment rate of return	7.875% (previously, 8.00%)
Projected salary increases	Varies by length of service with ultimate rates of 4.25% for Group 1, 4.50% for Group 2, and 4.75% for Group 4 (previously, 4.75% for Group 1 and 5.25% for Group 4)
Cost of living adjustments	3.00% of first \$14,000 of retirement income

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<b>Plan membership:</b>	
Retired participants and beneficiaries in pay status or with suspended benefits	5,077
Inactive participants entitled to a return of their employee contributions	2,632
Inactive participants with a vested right to a deferred or immediate benefit	384
Active participants	<u>9,082</u>
Total	17,175

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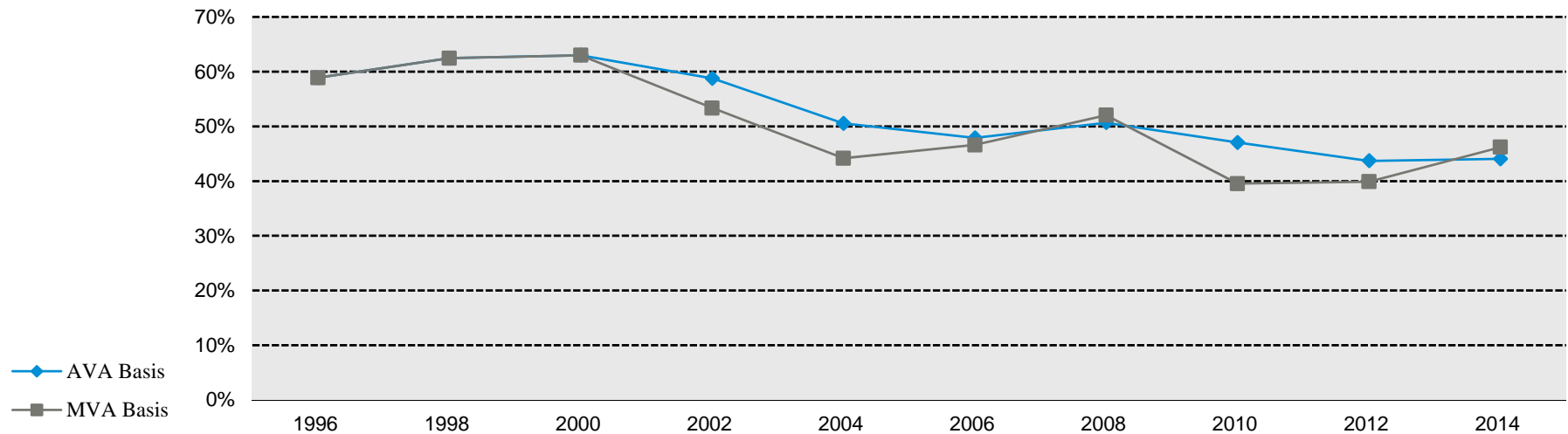
## SECTION 5: Reporting Information for the Middlesex County Retirement System

### EXHIBIT V

#### Funded Ratio

A critical piece of information regarding the Plan's financial status is the funded ratio. This ratio compares the actuarial value of assets to the actuarial accrued liabilities of the Plan as calculated. High ratios indicate a well-funded plan with assets sufficient to cover the plan's actuarial accrued liabilities. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other factors.

The chart below depicts a history of the funded ratios for this plan. On a market value basis, the funded ratio has increased from 39.89% as of January 1, 2012 to 46.18% as of January 1, 2014. On an actuarial basis, the funded ratio has increased from 43.68% as of January 1, 2012 to 44.05% as of January 1, 2014.



## SECTION 5: Reporting Information for the Middlesex County Retirement System

### EXHIBIT VI

#### Actuarial Assumptions and Actuarial Cost Method

##### Mortality Rates:

<i>Pre-Retirement:</i>	RP-2000 Employee Mortality Table projected 22 years with Scale AA (Previously, projected 12 years with Scale AA)
<i>Healthy Retiree:</i>	RP-2000 Healthy Annuitant Mortality Table projected 17 years with Scale AA (Previously, projected 12 years with Scale AA)
<i>Disabled Retiree:</i>	RP-2000 Healthy Annuitant Mortality Table set forward 3 years projected 17 years with Scale AA (Previously, set forward 2 years and projected 0 years)
	The RP-2000 Employee Mortality Table projected 22 years with Scale AA and the RP-2000 Healthy Annuitant Mortality Table projected 17 years with Scale AA were determined to contain provisions appropriate to reasonably reflect future mortality improvement, based on a review of the mortality experience of the plan.

##### Termination Rates before Retirement:

Age	Groups 1 and 2 - Rate (%)				Disability
	Mortality				
	Current		Previously		
	Male	Female	Male	Female	
20	0.02	0.01	0.03	0.02	0.02
25	0.03	0.02	0.03	0.02	0.02
30	0.04	0.02	0.04	0.02	0.03
35	0.07	0.04	0.07	0.04	0.06
40	0.09	0.05	0.10	0.06	0.10
45	0.11	0.08	0.13	0.09	0.15
50	0.14	0.11	0.17	0.14	0.19
55	0.20	0.21	0.24	0.23	0.24
60	0.34	0.35	0.40	0.37	0.28

Notes: 55% of the disability rates shown represent accidental disability.  
 20% of the accidental disabilities will die from the same cause as the disability.  
 55% of the death rates shown represent accidental death

## SECTION 5: Reporting Information for the Middlesex County Retirement System

### Termination Rates before Retirement (continued):

inued):

Group 4 – Rate (%)					
Mortality					Disability
Age	Current		Previously		
	Male	Female	Male	Female	
20	0.02	0.01	0.03	0.02	0.20
25	0.03	0.02	0.03	0.02	0.20
30	0.04	0.02	0.04	0.02	0.30
35	0.07	0.04	0.07	0.04	0.30
40	0.09	0.05	0.10	0.06	0.30
45	0.11	0.08	0.13	0.09	1.00
50	0.14	0.11	0.17	0.14	1.25
55	0.20	0.21	0.24	0.23	1.20
60	0.34	0.35	0.40	0.37	0.85

Notes: 90% of the disability rates shown represent accidental disability.

60% of the accidental disabilities will die from the same cause as the disability.

90% of the death rates shown represent accidental death.

### Withdrawal Rates:

Rate per year (%)			
Years of Service	Groups 1 and 2	Years of Service	Group 4
0	15.0	0	1.5
1	12.0	1	1.5
2	10.0	2	1.5
3	9.0	3	1.5
4	8.0	4	1.5
5 – 9	7.6	5	1.5
10 – 14	5.4	6	1.5
15 – 19	3.3	7	1.5
20 – 24	2.0	8	1.5
25 - 29	1.0	9	1.5
30+	0.0	10	1.5
		11+	0.0



**SECTION 5: Reporting Information for the Middlesex County Retirement System**

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**Retirement Rates:****Rate per year (%)****Groups 1 and 2**

<b>Age</b>	<b>Male</b>	<b>Female</b>	<b>Group 4</b>
45 – 49	--	--	1.0
50 – 54	--	--	2.0
55 – 59	2.0	5.5	15.0
60 – 61	12.0	5.0	20.0
62 – 64	30.0	15.0	25.0
65 – 68	40.0	15.0	100.0
69	50.0	20.0	--
70	100.0	100.0	--

**Retirement Age for Inactive  
Vested Participants:**

Age 60 (previously, age 65) for Group 1 and Group 2 members and age 55 for Group 4 members hired prior to April 2, 2012. For members hired April 2, 2012 or later, age 60 for Group 1 members, age 55 for Group 2 members and age 50 for Group 4 members.

**Unknown Data for Participants:**

Same as those exhibited by participants with similar known characteristics. If not specified, participants are assumed to be male.

**Family Composition:**

75% of participants are assumed to be married. None are assumed to have dependent children. Females are assumed to be three years younger than their spouses.

**Benefit Election:**

All participants are assumed to elect Option A.

**Net Investment Return:**

7.875% (previously, 8.00%)

**Interest on Employee Contributions:**

3.5%

## SECTION 5: Reporting Information for the Middlesex County Retirement System

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### Salary Increases:

Years of Service	Group 1	Group 2	Group 4
0	6.00%	6.00%	7.00%
1	5.50%	5.50%	6.50%
2	5.50%	5.50%	6.00%
3	5.25%	5.25%	5.75%
4	5.25%	5.25%	5.25%
5	4.75%	4.75%	5.25%
6	4.75%	4.75%	4.75%
7	4.50%	4.50%	4.75%
8	4.50%	4.50%	4.75%
9+	4.25%	4.50%	4.75%

*Includes an allowance for inflation of 4.0% per year.*

(Previously, 4.75% for Group 1 and 2 members and 5.25% for Group 4 members, including allowance for inflation of 4.5% per year.)

### Administrative Expenses:

\$3,400,000 for calendar year 2014, increasing 4.0% per year (previously, \$3,100,000 for calendar year 2012, increasing 4.5% per year)

### 2013 Salary:

2013 salaries are equal to salaries provided in the data, except for actives missing salary and employees with less than one year of service, where salaries are calculated from annualized contributions divided by the contribution rates provided.

### Total Service:

Total creditable service reported in the data.

### Net 3(8)(c) Liability:

No liability is valued for benefits paid to or received from other municipal systems.

### Actuarial Value of Assets:

Market value of assets as reported in the System's Annual Statement less unrecognized return in each of the last five years. Unrecognized return is equal to the difference between the actual market value return and the expected market value return and is recognized at 20% per year over a five-year period, further adjusted, if necessary, to be within 20% of the market value.

## SECTION 5: Reporting Information for the Middlesex County Retirement System

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<b>Actuarial Cost Method:</b>	Entry Age Normal Actuarial Cost Method. Entry Age is the age of the participant less total creditable service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary. Normal Cost is determined by using the plan of benefits applicable to each participant. (Previously, Normal Cost determined as if the current plan of benefits had always been in effect.)
<b>Changes in Assumptions:</b>	<p>This valuation reflects the following:</p> <ul style="list-style-type: none"><li>➤ The actuarial cost method was changed to better reflect the impact of the plan changes effective for employees hired on or after April 2, 2012.</li><li>➤ The pre-retirement mortality assumption was changed from the RP-2000 Employee Mortality Table projected 12 years with Scale AA to the RP-2000 Employee Mortality Table projected 22 years with Scale AA.</li><li>➤ The mortality assumption for non-disabled retirees was changed from the RP-2000 Healthy Annuitant Mortality Table projected 12 years with Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected 17 years with Scale AA.</li><li>➤ The mortality assumption for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward two years to the RP-2000 Healthy Annuitant Mortality Table set forward three years projected 17 years with Scale AA.</li><li>➤ The investment return assumption was lowered from 8.00% to 7.875%.</li><li>➤ The salary increase assumption was changed from level rates of 4.75% per year for Group 1 and Group 2 members and 5.25% per year for Group 4 members, including an allowance for inflation of 4.5% per year, to rates based on years of service with ultimate rates of 4.25% per year for Group 1 members, 4.5% per year for Group 2 members and 4.75% per year for Group 4 members, including an allowance for inflation of 4.0% per year.</li><li>➤ The assumed retirement age for inactive vested participants was changed from age 65 to age 60 for Group 1 and 2 members and remained the same at age 55 for Group 4 members hired prior to April 2, 2012. For participants hired April 2, 2012 or later, the assumption is 60 for Group 1 members, 55 for Group 2 members, and 50 for Group 4 members.</li></ul>

## **SECTION 5: Reporting Information for the Middlesex County Retirement System**

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- The administrative expense assumption was increased from \$3,100,000 for calendar 2012 to \$3,400,000 for calendar 2014.

## SECTION 5: Reporting Information for the Middlesex County Retirement System

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### EXHIBIT VII

#### Summary of Plan Provisions

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This exhibit summarizes the major provisions of Chapter 32 of the Laws of Massachusetts.

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**Plan Year:** January 1 – December 31

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#### Retirement Benefits

Employees covered by the Contributory Retirement Law are classified into one of four groups depending on job classification. Group 1 comprises most positions in state and local government. It is the general category of public employees. Group 4 comprises mainly police and firefighters. Group 2 is for other specified hazardous occupations. (Officers and inspectors of the State Police are classified as Group 3.)

For employees hired prior to April 2, 2012, the annual amount of the retirement allowance is based on the member's final three-year average salary multiplied by the number of years and full months of creditable service at the time of retirement and multiplied by a percentage according to the following table based on the age of the member at retirement:

#### Age Last Birthday at Date of Retirement

Percent	Group 1	Group 2	Group 4
2.5	65 or over	60 or over	55 or over
2.4	64	59	54
2.3	63	58	53
2.2	62	57	52
2.1	61	56	51
2.0	60	55	50
1.9	59	--	49
1.8	58	--	48
1.7	57	--	47
1.6	56	--	46
1.5	55	--	45

## SECTION 5: Reporting Information for the Middlesex County Retirement System

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A member's final three-year average salary is defined as the greater of the highest consecutive three-year average annual rate of regular compensation and the average annual rate of regular compensation received during the last three years of creditable service prior to retirement.

For employees hired on April 2, 2012 or later, the annual amount of the retirement allowance is based on the member's final five-year average salary multiplied by the number of years and full months of creditable service at the time of retirement and multiplied by a percentage according to the following tables based on the age and years of creditable service of the member at retirement:

### For members with less than 30 years of creditable service:

#### Age Last Birthday at Date of Retirement

Percent	Group 1	Group 2	Group 4
2.50	67 or over	62 or over	57 or over
2.35	66	61	56
2.20	65	60	55
2.05	64	59	54
1.90	63	58	53
1.75	62	57	52
1.60	61	56	51
1.45	60	55	50

### For members with 30 years of creditable service or greater:

#### Age Last Birthday at Date of Retirement

Percent	Group 1	Group 2	Group 4
2.500	67 or over	62 or over	57 or over
2.375	66	61	56
2.250	65	60	55
2.125	64	59	54
2.000	63	58	53
1.875	62	57	52
1.750	61	56	51
1.625	60	55	50

## SECTION 5: Reporting Information for the Middlesex County Retirement System

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A member's final five-year average salary is defined as the greater of the highest consecutive five-year average annual rate of regular compensation and the average annual rate of regular compensation received during the last five years of creditable service prior to retirement.

For employees who became members after January 1, 2011, regular compensation is limited to 64% of the federal limit found in 26 U.S.C. 401(a)(17). In addition, regular compensation for members who retire after April 2, 2012 will be limited to prohibit "spiking" of a member's salary to increase the retirement benefit.

For all employees, the maximum annual amount of the retirement allowance is 80 percent of the member's final average salary. Any member who is a veteran also receives an additional yearly retirement allowance of \$15 per year of creditable service, not exceeding \$300. The veteran allowance is paid in addition to the 80 percent maximum.

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### Employee Contributions

Date of Hire	Contribution Rate
Prior to January 1, 1975	5%
January 1, 1975 – December 31, 1983	7%
January 1, 1984 – June 30, 1996	8%
July 1, 1996 onward	9%

In addition, employees hired after December 31, 1978 contribute an additional 2 percent of salary in excess of \$30,000.

Employees hired after 1983 who voluntarily withdraw their contributions with less than 10 ten years of credited service receive 3% interest on their contributions.

Employees in Group 1 hired on or after April 2, 2012 with 30 years of creditable service or greater will pay a base contribution rate of 6%.

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### Retirement Benefits (Superannuation)

Members of Group 1, 2 or 4 hired prior to April 2, 2012 may retire upon the attainment of age 55. For retirement at ages below 55, twenty years of creditable service is required.

## SECTION 5: Reporting Information for the Middlesex County Retirement System

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Members hired prior to April 2, 2012 who terminate before age 55 with ten or more years of creditable service are eligible for a retirement allowance upon the attainment of age 55 (provided they have not withdrawn their accumulated deductions from the Annuity Savings Fund of the System).

Members of Group 1 hired April 2, 2012 or later may retire upon the attainment of age 60. Members of Group 2 or 4 hired April 2, 2012 or later may retire upon the attainment of age 55. Members of Group 4 may retire upon attainment of age 50 with ten years of creditable service.

Members hired April 2, 2012 or later who terminate before age 55 (60 for members of Group 1) with ten or more years of creditable service are eligible for a retirement allowance upon the attainment of age 55 (60 for members of Group 1) provided they have not withdrawn their accumulated deductions from the Annuity Savings Fund of the System.

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### Ordinary Disability Benefits

A member who is unable to perform his or her job due to a non-occupational disability will receive a retirement allowance if he or she has ten or more years of creditable service and has not reached age 55. The annual amount of such allowance shall be determined as if the member retired for superannuation at age 55 (age 60 for Group 1 members hired on or after April 2, 2012), based on the amount of creditable service at the date of disability. For veterans, there is a minimum benefit of 50 percent of the member's most recent year's pay plus an annuity based on his or her own contributions.

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### Accidental Disability Benefit

For a job-connected disability, the benefit is 72 percent of the member's most recent annual pay plus an annuity based on his or her own contributions, plus additional amounts for surviving children. Benefits are capped at 75 percent of annual rate of regular compensation for employees who become members after January 1, 1988.



## SECTION 5: Reporting Information for the Middlesex County Retirement System

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### Death Benefits

In general, the beneficiary of an employee who dies in active service will receive a refund of the employee's own contributions. Alternatively, if the employee were eligible to retire on the date of death, a spouse's benefit will be paid equal to the amount the employee would have received under Option C. The surviving spouse of a member who dies with two or more years of credited service has the option of a refund of the employee's contributions or a monthly benefit regardless of eligibility to retire, if they were married for at least one year. There is also a minimum widow's pension of \$500 per month, and there are additional amounts for surviving children.

If an employee's death is job-connected, the spouse will receive 72 percent of the member's most recent annual pay, in addition to a refund of the member's accumulated deductions, plus additional amounts for surviving children. However, in accordance with Section 100 of Chapter 32, the surviving spouse of a police officer, firefighter or corrections officer is killed in the line of duty will be eligible to receive an annual benefit equal to the maximum salary held by the member at the time of death.

Upon the death of a job-connected disability retiree who retired prior to November 7, 1996 and could not elect an Option C benefit, a surviving spouse will receive an allowance of \$9,000 per year if the member dies for a reason unrelated to cause of disability.

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### "Heart And Lung Law" And Cancer Presumption

Any case of hypertension or heart disease resulting in total or partial disability or death to a uniformed fireman, permanent member of a police department, or certain employees of a county correctional facility is presumed to have been suffered in the line of duty, unless the contrary is shown by competent evidence. Any case of disease of the lungs or respiratory tract resulting in total disability or death to a uniformed fireman is presumed to have been suffered in the line of duty, unless the contrary is shown by competent evidence. There is an additional presumption for uniformed firemen that certain types of cancer are job-related if onset occurs while actively employed or within five years of retirement.

## SECTION 5: Reporting Information for the Middlesex County Retirement System

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### Options

Members may elect to receive a full retirement allowance payable for life under Option A. Under Option B a member may elect to receive a lower monthly allowance in exchange for a guarantee that at the time of death any contributions not expended for annuity payments will be refunded to the beneficiary. Option C allows the member to take a lesser retirement allowance in exchange for providing a survivor with two-thirds of the lesser amount. Option C pensioners will have benefits converted from a reduced to a full retirement if the beneficiary predeceases the retiree.

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### Post-Retirement Benefits

The Board has adopted the provisions of Section 51 of Chapter 127 of the Acts of 1999, which provide that the Retirement Board may approve an annual COLA in excess of the Consumer Price Index but not to exceed a 3% COLA on the first \$14,000 of a retirement allowance. Cost-of-living increases granted prior to July 1, 1998 are reimbursed by the Commonwealth and not reflected in this report.

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### Changes in Plan Provisions

Members hired on or after April 2, 2012 are covered by the provisions of Chapter 32 as amended by of Chapter 176 of the Acts of 2011 and Chapter 139 of the Acts of 2012.

## SECTION 6: GASB 67/68 Information for the Middlesex County Retirement System

### EXHIBIT 1

#### Net Pension Liability

The components of the net pension liability of the Middlesex County Retirement System at December 31, 2013 were as follows:

Total pension liability	\$2,195,732,452
Plan fiduciary net position	1,014,013,415
System's net pension liability	1,181,719,037
Plan fiduciary net position as a percentage of the total pension liability	46.18%

*Actuarial assumptions.* The total pension liability was determined by an actuarial valuation as of December 31, 2013, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	4.00%
Salary increases	

Years of Service	Group 1	Group 2	Group 4
0	6.00%	6.00%	7.00%
1	5.50%	5.50%	6.50%
2	5.50%	5.50%	6.00%
3	5.25%	5.25%	5.75%
4	5.25%	5.25%	5.25%
5	4.75%	4.75%	5.25%
6	4.75%	4.75%	4.75%
7	4.50%	4.50%	4.75%
8	4.50%	4.50%	4.75%
9+	4.25%	4.50%	4.75%

Investment rate of return	7.875%, net of pension plan investment expense, including inflation
Cost of Living Adjustments	3% of first \$14,000

## SECTION 6: GASB 67/68 Information for the Middlesex County Retirement System

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### Healthy:

Pre-Retirement RP-2000 Employee Mortality Table projected 22 years with Scale AA

Post-Retirement RP-2000 Healthy Annuitant Mortality Table projected 17 years with Scale AA

Disabled: RP-2000 Healthy Annuitant Mortality Table set forward three years projected 17 years with Scale AA

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of arithmetic real rates of return for each major asset class included in the pension plan's target asset allocation as of December 31, 2013 are summarized in the following table:

Asset Class	Long-Term Expected Real Rate of Return
Domestic equity	6.60%
International developed markets equity	7.10%
International emerging markets equity	9.40%
Core fixed income	2.20%
High yield fixed income	4.70%
Real estate	4.40%
Commodities	4.40%
Short-term government money market	1.80%
Hedge fund, GTAA, Risk parity	3.90%
Private equity	11.70%

*Discount rate:* The discount rate used to measure the total pension liability was 7.875%. The projection of cash flows used to determine the discount rate assumed plan member contributions will be made at the current contribution rate and that the Middlesex County Retirement System contributions will be made at rates equal to the actuarially determined contribution rates. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

## SECTION 6: GASB 67/68 Information for the Middlesex County Retirement System

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*Sensitivity of the net pension liability to changes in the discount rate.* The following presents the net pension liability of the Middlesex County Retirement System, calculated using the discount rate of 7.875%, as well as what the Middlesex County Retirement System's net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.875%) or 1-percentage-point higher (8.875%) than the current rate:

	<b>1% Decrease (6.875%)</b>	<b>Current Discount (7.875%)</b>	<b>1% Increase (8.875%)</b>
Middlesex County Retirement System's net pension liability as of December 31, 2013	\$1,425,397,451	\$1,181,719,037	\$974,340,475

## SECTION 6: GASB 67/68 Information for the Middlesex County Retirement System

### EXHIBIT 2

#### Pension Expense and Deferred Outflows/Inflows of Resources Related to Pensions

##### A. Pension expense for the year ended June 30, 2015

Service cost	\$52,132,389
Interest	--
Recognized portion of current-period difference between expected and actual experience	--
Contributions – employee	--
Projected earnings on pension plan investments	--
Recognized portion of current-period difference between projected and actual earnings on pension plan investments	--
Recognition of deferred outflows of resources	--
Recognition of deferred inflows of resources	--
Pension expense for fiscal year ended June 30, 2015	To be determined

##### B. Deferred outflows/inflows of resources related to pensions

	Deferred Outflows of Resources	Deferred Inflows of Resources
Differences between expected and actual experience	--	--
Changes of assumptions	--	--
Changes of benefit terms	--	--
Net difference between projected and actual earnings on pension plan investments	--	--
Total	To be determined	To be determined

##### C. Projected recognition of deferred outflows/(inflows)

	Year Ended June 30,	Recognition
	2016	--
	2017	--
	2018	--
	2019	--
	2020	--
	Thereafter	--

*Note: Entry Age Normal liabilities calculated using ages and service amounts as of January 1, 2014 are used to measure the pension expense for fiscal year ended June 30, 2015.*

## SECTION 6: GASB 67/68 Information for the Middlesex County Retirement System

### EXHIBIT 3

#### Schedule of Changes in the Net Pension Liability – Last Ten Years

	Year End December 31,									
	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
<b>Total pension liability</b>										
Service cost	\$52,132,389									
Interest	- -									
Differences between expected and actual experience	- -									
Changes of assumptions	- -									
Changes of benefit terms	- -									
Benefit payments, including refunds of employee contributions	- -									
<b>Net change in total pension liability</b>	TBD									
<b>Total pension liability - beginning</b>	2,195,732,452									
<b>Total pension liability - ending (a)</b>	TBD									
<b>Plan fiduciary net position</b>										
Contributions - employer	- -									
Contributions - employee	- -									
Net investment income	- -									
Benefit payments, including refunds of employee contributions	- -									
Other	- -									
<b>Net change in fiduciary net position</b>	TBD									
<b>Plan fiduciary net position - beginning</b>	1,014,013,415									
<b>Plan fiduciary net position - ending (b)</b>	TBD									
<b>Net pension liability – ending: (a)-(b)</b>	TBD									
<b>Plan's fiduciary net position as a percentage of the total pension liability</b>	TBD									
<b>Covered-employee payroll</b>	\$415,752,810									
<b>Net pension liability as a percentage of covered-employee payroll</b>	TBD									

\*Covered-employee payroll as reported in the January 1, 2014 funding valuation report

## SECTION 6: GASB 67/68 Information for the Middlesex County Retirement System

### EXHIBIT 4

#### Schedule of Contributions – Last Ten Years

	Year End December 31,									
	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
Actuarially determined contribution*	\$94,523,281									
Contributions in relation to the actuarially determined contribution	TBD									
Contribution deficiency (excess)	TBD									
Covered-employee payroll	\$415,752,810									
Contributions as a percentage of covered-employee payroll	22.74%									

(Historical information prior to implementation of GASB 67/68 is not required)

\* Based on the results of the January 1, 2012 actuarial valuation (including assumptions and methods) which determined budgeted appropriation for fiscal 2015.



## SECTION 6: GASB 67/68 Information for the Middlesex County Retirement System

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### EXHIBIT 5

#### Notes to Required Supplementary Information

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<b>Valuation date</b>	Actuarial determined contribution rates are calculated as of January 1 two years prior to the end of the employer's fiscal year in which contributions are reported.
<b>Actuarial cost method</b>	Entry Age Normal Cost Method
<b>Amortization method</b>	Prior year's total contribution increased by 6.5% for fiscal 2014 through fiscal 2020, and thereafter the remaining unfunded liability will be amortized on a 4.0% annual increasing basis; ERI liability amortized in level payments
<b>Remaining amortization period</b>	As of July 1, 2012, 7 years remaining for 2002 ERI liability, 8 years remaining for 2003 ERI liability, 10 years remaining for 2010 ERI liability and 23 years for remaining unfunded liability.
<b>Asset valuation method</b>	The difference between the expected return and the actual investment return on a market value basis is recognized over a five-year period. Asset value is adjusted as necessary to be within 20% of the market value.

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<b>Actuarial assumptions:</b>	
Investment rate of return	7.875% (previously, 8.00%)
Discount rate	7.875% (previously, 8.00%)
Inflation rate	4.00%
Projected salary increases	Varies by length of service with ultimate rates of 4.25% for Group 1, 4.50% for Group 2, and 4.75% for Group 4
Cost of living adjustments	3.00% of first \$14,000 of retirement income

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<b>Plan membership:</b>	
Retired participants and beneficiaries in pay status or with suspended benefits	5,077
Inactive participants entitled to a return of their employee contributions	2,632
Inactive participants with a vested right to a deferred or immediate benefit	384
Active participants	<u>9,082</u>
Total	17,175

## SECTION 6: GASB 67/68 Information for the Middlesex County Retirement System

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### Changes in Assumptions:

The actuarial cost method was changed to better reflect the impact of the plan changes effective for employees hired on or after April 2, 2012.

The pre-retirement mortality assumption was changed from the RP-2000 Employee Mortality Table projected 12 years with Scale AA to the RP-2000 Employee Mortality Table projected 22 years with Scale AA.

The mortality assumption for non-disabled retirees was changed from the RP-2000 Healthy Annuitant Mortality Table projected 12 years with Scale AA to the RP-2000 Healthy Annuitant Mortality Table projected 17 years with Scale AA.

The mortality assumption for disabled participants was changed from the RP-2000 Healthy Annuitant Mortality Table set forward two years to the RP-2000 Healthy Annuitant Mortality Table set forward three years projected 17 years with Scale AA.

The investment return assumption was lowered from 8.00% to 7.875%.

The salary increase assumption was changed from level rates of 4.75% per year for Group 1 and Group 2 members and 5.25% per year for Group 4 members, including an allowance for inflation of 4.5% per year, to rates based on years of service with ultimate rates of 4.25% per year for Group 1 members, 4.5% per year for Group 2 members and 4.75% per year for Group 4 members, including an allowance for inflation of 4.0% per year.

The assumed retirement age for inactive vested participants was changed from age 65 to age 60 for Group 1 and 2 members and remained the same at age 55 for Group 4 members hired prior to April 2, 2012. For participants hired April 2, 2012 or later, the assumption is 60 for Group 1 members, 55 for Group 2 members, and 50 for Group 4 members.

The administrative expense assumption was increased from \$3,100,000 for calendar 2012 to \$3,400,000 for calendar 2014.

### Changes in Plan Provisions:

Members hired on or after April 2, 2012 are covered by the provisions of Chapter 32 as amended by Chapter 176 of the Acts of 2011 and Chapter 139 of the Acts of 2012.

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